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B.V.A. News

IN this issue of THE VETERINARY RECORD a departure from precedent is being made. From now, and henceforward, news of the activities of B.V.A. Divisions, together with the proceedings of Council and the reports of standing committees will appear in these pages, and not be published separately in a supplement to the journal. On another page will be found accounts of two divisional meetings and others will follow; the Council meeting of January 20th will be reported in a fortnight's time.

It is hoped that this implementation of a Council decision will give general satisfaction. The British Veterinary Association is a body of national standing, and accounts of its work, one may suggest, should be available outside the bounds of its own membership—which the Supplement was not. In any case, an important function of THE VETERINARY RECORD is that of official journal to the B.V.A., so that this extension of what may be called its domestic news coverage falls within its original remit. What remains now is to hope that Divisions, veterinary clubs and other bodies affiliated either by formal arrangement or by community of interest and aim will support the new feature by contributing regularly to it. Those Divisions whose activities lead to the production of original papers, such as the Association of Veterinary Teachers and Research Workers, the Central Veterinary Society and others have for long been valued, indeed indispensable contributors to this journal; but most others, at their meetings, discuss clinical and professional subjects, some account of which would be of great interest to their colleagues elsewhere. It is realised that to ask for such accounts is no light request. Divisional officers are busy men with their own practices or careers demanding the majority of their time, and the preparation of material for publication—to say nothing of the garnering of it in the first place—is an onerous task. Perhaps members of Divisions and clubs can be persuaded to share the work by some system of rotation, in order that valuable material, often the fruit of ripe, even unique experience, may not be just the content of a passing hour but rather be made permanent by publication.

We shall welcome, too, general divisional news from the point of view that the B.V.A. is, in essence, the sum of its constituent parts, that Council may be regarded in large measure as the Parliament of elected divisional representatives, and that its deliberations and subsequent actions represent a quintessence of the profession's ideas, hopes and intentions. Regular news of what is said and done at local meetings can help to focus thought in a wider context and formulate the views of the majority, thus enabling Council to become, in a maximum degree, the precise instrument of the general wish.

We are fortunate in having a large number of readers in addition to the members of the B.V.A., and it should be explained to them that the space we hope to give to our domestic interests will not impinge upon that devoted to scientific and clinical papers, to current literature or other regular features. These will continue in the same volume, or, indeed, in larger volume if the number of well-presented manuscripts offered for publication continues to increase as it has been doing. In any case it well may be that those readers whose interests are congruous with ours, even though they are not members of this Association, will find much of interest in following the indications of veterinary thought which the divisional, club, and Council reports will provide.

Ours is a profession comparatively small in numbers, and for that reason cherishes a "family spirit" hardly attainable by larger bodies. If the new divisional feature does nothing more than draw the family closer together, it will justify itself, and repay the trouble of those divisional officers and others who will help to make it a success.

The Histopathology of an Entero-hepatic Syndrome of Turkey Poults

BY
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SUMMARY.—The clinical and macroscopic features of 3 outbreaks of a disease of turkey poults with very high mortality are described. The characteristic and very striking histological changes in duodenum, liver, and kidney are described in considerable detail.

The livers of such turkey poults are diffusely affected with very severe necrobiotic changes accompanied by marked regeneration. The kidneys show the typical lesions of membranous glomerulonephritis and hyaline droplet nephrosis, while marked catarrhal enteritis is the characteristic finding in the duodenum.

These histological lesions lend support to the possibility of a toxic aetiology which has been suggested before on several occasions, but the toxic agent remains unidentified.

A NUMBER of outbreaks of a disease affecting turkey poults, with high mortality, were reported in the counties of Berkshire, Buckinghamshire, Northamptonshire and Oxfordshire, during June, July, and August, 1960. The losses usually occurred when the poults were 2 to 4 weeks old, but in some cases deaths began to occur within 2 to 4 days of hatching while in other outbreaks birds up to 8 weeks old were affected.

Poults often were found dead and usually in good bodily condition. In a few instances the birds were seen to be ill; they were depressed, had an unsteady gait, and later the muscles of the limbs appeared to stiffen and the birds would fall on their sides before death. Some birds showed torticollis.

In the 11 outbreaks investigated the birds were being fed on proprietary food "Brand X", turkey crumbs containing an anti-blackhead drug and a coccidiostat. In cases where some of the birds survived, deaths stopped shortly after the food was changed to another brand or to a simple cereal diet.

The following account deals with 3 out of the 11 outbreaks of disease which were typical of all.

Clinical Findings

Flock 1

Fifty Broad Breasted Bronze turkey poults (day-old) were purchased and put into brooders which had given satisfactory rearing results with earlier hatches. The first deaths began when the poults were 7 days old and continued steadily until, after a period of 21 days, all the birds had died. The owner did not notice any symptoms of illness while the birds were on their legs; the poults fell on their sides and died within a few minutes. Therapeutic courses of Aureomycin and furazolidone did not appear to affect the incidence or the course of the disease.

Post-mortem *findings*. The bodily condition was good. The feathers around the vent were not soiled. The carcases were congested and there was general slight oedema. The livers were severely congested, enlarged, turgid and firm, and appeared as if they had been preserved for some time in formalin. The gall bladders were well filled. The kidneys were very swollen and congested. The myocardium was congested and the pericardial sac distended by clear straw-coloured fluid. There was food in the crops and, in some birds, there were particles of litter in the gizzards; otherwise the alimentary tracts were empty. Catarrhal enteritis, most severe in the duodenum, was present. No pathogenic organisms could be isolated when the heart blood and the liver were cultured on 5 per cent. blood agar and desoxycholate citrate agar. Material from this outbreak was examined histologically.

It is of interest that, when all the original poults had died, 50 1-month-old turkey poults were purchased from the same source and fed on the remainder of the food for 14 days, when the diet was changed to turkey grower pellets. Morbidity and mortality were negligible in this group.

Flock 2

Seventy 1-day-old Broad Breasted White turkey poults and 100 Broad Breasted Bronze poults from separate hatcheries together made up a batch for rearing. The Bronze poults started to die immediately and *Salmonella saint paul* was consistently isolated from the internal organs. Furazolidone was administered in the food at a therapeutic level of 0.04 per cent. to the whole group for 10 days. Twenty-seven Bronze birds died during 7 days of treatment but no deaths occurred in the White birds which had been in contact. At the end of 7 days the White birds started to die but no *Salmonellae* were isolated from the carcases. There were only 40 survivors out of the original 170 when the poults were 3 weeks old.

During the same period deaths commenced in a second group of 70 2-month-old White poults housed well away from other stock and managed by a separate attendant. There had been no previous deaths in this group from 1 day old. There were no significant bacterial findings and 30 out of 70 birds died.

While deaths were occurring in the first batches a third group of 100-day-old Bronze poults was purchased. These started to die at 4 to 5 days of age; deaths occurred at a rate of approximately 12 per day. Within 14 days 78 out of 100 had died. The symptoms and *post-mortem* findings shown by these 3 batches were similar to those seen in Flock 1 and in some poults loose whitish droppings were observed. Material from this outbreak was also examined histologically.

W. G. SILLER & D. C. OSTLER.—THE HISTOPATHOLOGY OF AN ENTERO-HEPATIC SYNDROME OF TURKEY POULTS

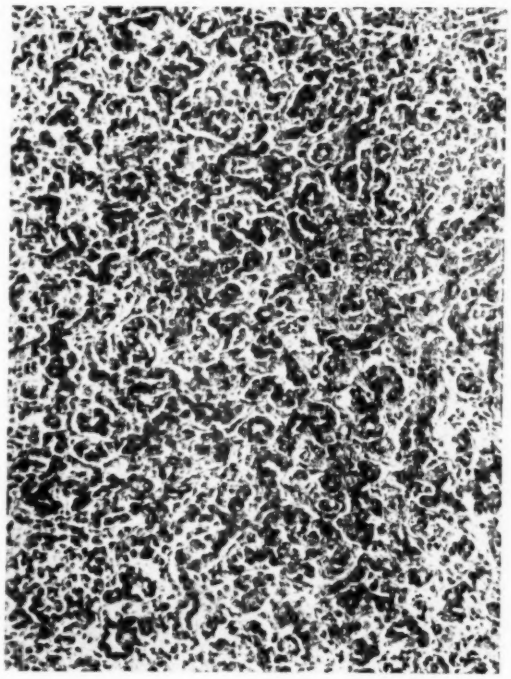

FIG. 1.—"Tubules" of regenerating liver cells distributed evenly throughout the organ. Note the marked proliferation of sinusoidal reticulo-endothelial cells. H. & E. × 100.

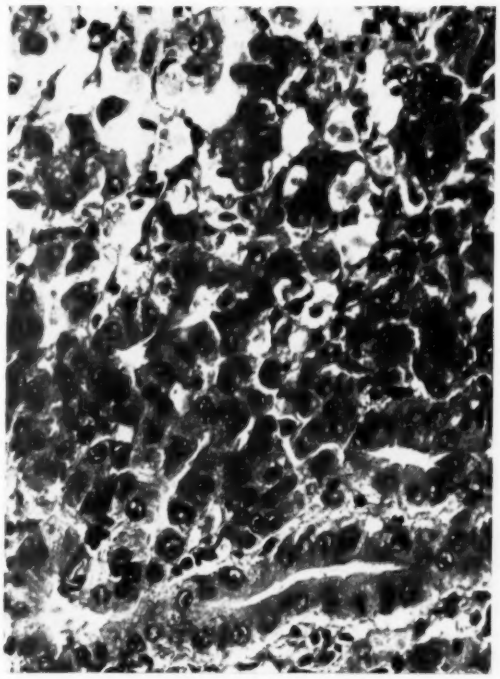

FIG. 3.—Illustrates the edge of an area of necrobiosis (above) the regenerating liver cells appear as well differentiated tubules, but their hepatic origin cannot be questioned. A mitotic figure is seen bottom left. H. & E. × 350.

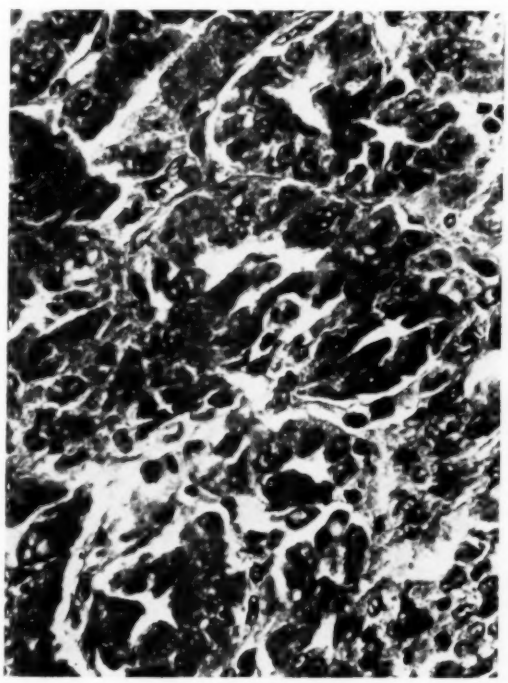

FIG. 2.—Groups of regenerating liver cells arranged in the characteristic tubular form. Note the mitotic figure in the centre. H. & E. × 400.

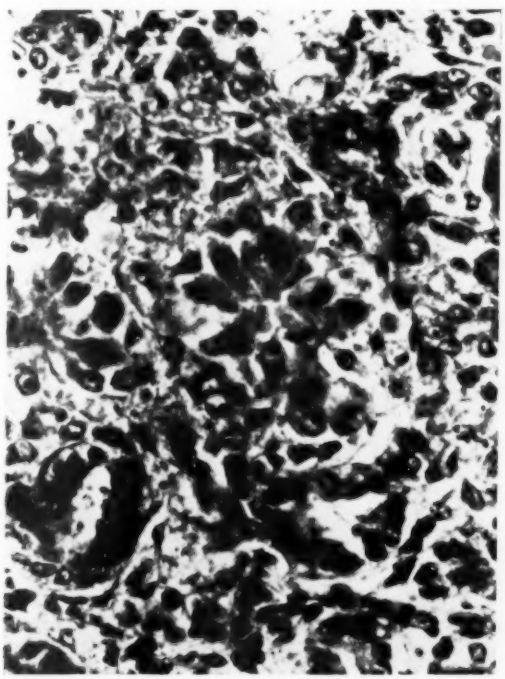

FIG. 4.—In the centre of the picture there is an islet of degenerated liver tissue surrounded by hyperplastic reticulo-endothelium and tubules of regenerated liver tissue. Note the prominent nucleoli and the margination of chromatin in the enlarged nuclei of the necrobiotic cells. H. & E. × 500.

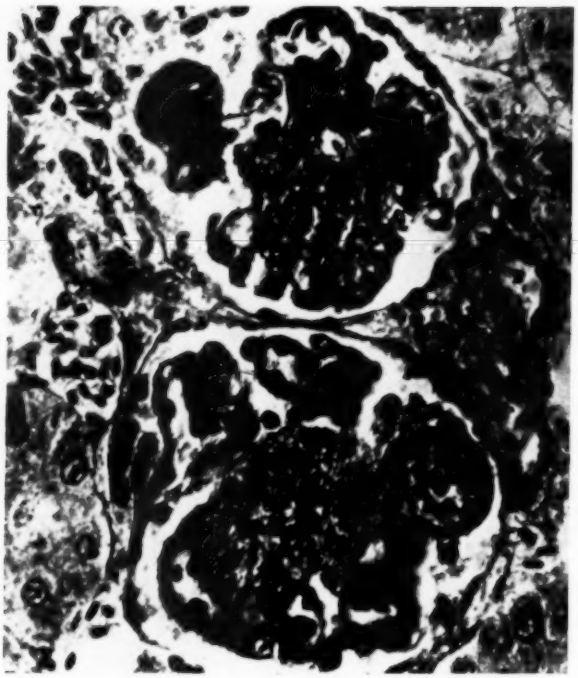

FIG. 5.—Two glomeruli showing the typical membranous changes. Note the thickened, dense basement membranes and the nodular thickening (top right). There are no proliferative changes but the capillary loops are ischaemic. P.A.S. × 560.

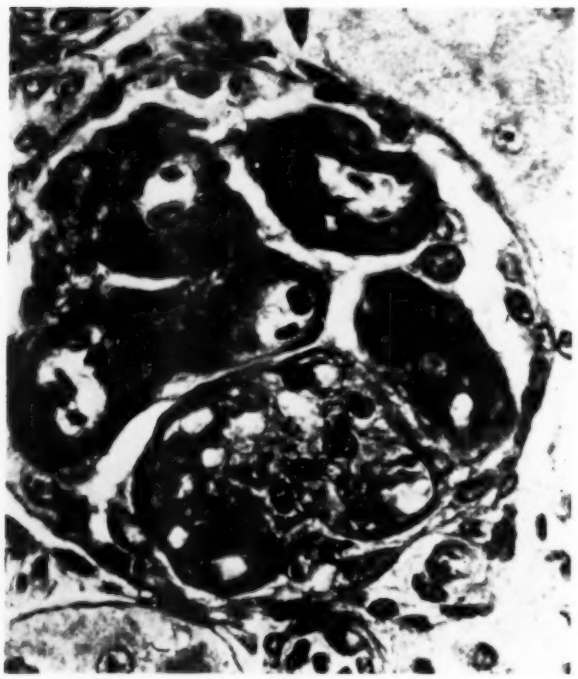

FIG. 6.—A glomerulus showing very marked membranous thickening of the looser more diffuse type. Ischaemia is pronounced but the glomerulus is not enlarged nor are there any proliferative changes, but P.A.S.-positive granules may be seen in Bowman's capsule. P.A.S. × 680.

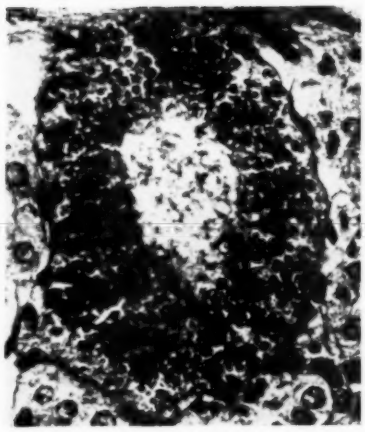

FIG. 7.—A proximal convoluted tubule with the typical changes of hyalin droplet nephrosis. The cytoplasm of the epithelial cells is tightly packed with P.A.S.-positive droplets. Note the still intact nuclei of this and the neighbouring tubules. P.A.S. × 400.

FIG. 8.—Normal liver showing the reticulum fibres surrounding the liver cell cords. Gordon & Sweet × 400.

FIG. 9.—Necrobiotic liver cells. The reticulum network is sparse and incomplete. Note the swelling of the parenchymal cells and the enlargement of the nuclei with their prominent nucleoli. Gordon & Sweet × 400.

Flock 3

One hundred and sixty 1-day-old Broad Breasted Bronze turkey poults started to die within 24 hours of arrival on the farm. *Salm. typhi-murium*, phage type 1A, was consistently isolated and during 4 days approximately 100 poults died. The remaining birds were immediately changed to another food, "Brand B" turkey starter crumbs, because it was readily available and contained the therapeutic level of furazolidone. Very few deaths occurred subsequently; approximately 60 poults were reared successfully. Two hundred and seventy 14-day-old turkey poults were in a brooder only a few feet from the birds infected with *Salm. typhi-murium*. Furazolidone at the prophylactic level of 0.01 per cent. was mixed with "Brand X" turkey starter crumbs and deaths commenced in this group 3 days later. The birds were then divided equally between 4 outside Motley brooders but deaths continued. Bacteriological examinations were negative and it was thought that the isolation of *Salmonellae* might have been inhibited by the presence of furazolidone. To clarify this the livers and terminal intestines of 17 birds which had died were cultured using selenite and desoxycholate citrate agar. As sparse colonies were obtained from 4 birds only, salmonellosis was not considered to be the responsible agent of disease. Estimations of sodium and chloride of the food gave results within the normal range. Ketones were not detected in blood serum samples from 5 typically affected birds. Mortality persisted in this group until 250 out of 270 had died during 18 days.

The farm was visited when over half of the 270 birds had died; there was a high standard of husbandry with very experienced labour. The remaining poults were dull, mildly interested in food, cheeped continuously, developed an unsteady gait as they became weak, and finally fell on their sides and died. Two typical birds, which seemed reasonably alert, were chosen for observation at the laboratory but these died within half an hour of leaving the brooder. The survivors were then obtained for observation. On reaching the laboratory they were subdued, huddled to heat sources, and the feathers appeared ruffled and unduly loose in the skin. Drinking water containing 3 per cent. glucose, and a proprietary chickmeal, were readily consumed. One bird died during the first 24 hours, but there were no further casualities and the birds grew normally over the next 2 months.

Post-mortem findings in this outbreak were almost identical with those described above, but there was no oedema in the birds which died during the later stages. Material for histological examination was taken at various stages of the disease.

Another batch of 100 1-day-old Broad Breasted White poults were fed on "Brand B" turkey starter crumbs containing furazolidone as a prophylactic measure and the rearing percentage was completely satisfactory.

Sixty well grown 5-week-old Broad Breasted Bronze poults were purchased to replace the casualties and fed on the remainder of the consignment of "Brand X" turkey crumbs for 10 to 14 days. Two of these birds died of moniliasis. The farmer noticed an unusually strong smell from the droppings. Turkey grower pellets were fed after 14 days and a satisfactory number of birds was reared.

Older birds appeared to be more resistant. In Flock 1, though there was a 100 per cent. mortality in birds between the ages of 7 and 28 days, birds imported from the same hatchery when 28 days old and fed on the remainder of the food for 10 days did not show clinical disease. In Flock 3, 78 out of 100 birds died between the ages of 1 to 3 weeks, whereas only 30 out of 70 8-week-old birds succumbed.

It may be relevant to mention that during the last 2 years somewhat similar macroscopic *post-mortem* features have been noted in older turkeys, particularly 7 to 10 days after a change of food, from growing to fattening pellets.

Histological Observations

Prompt fixation in Susa of only fresh material ensured that *post-mortem* change was minimal in all tissues examined. Paraffin sections were routinely stained with haematoxylin and eosin. Other special techniques such as the periodic acid Schiff reaction and the Gordon-Sweet Silver impregnation method were employed also. The most striking and constant abnormalities were observed in the liver, kidney and duodenum.

Liver

Marked retrogressive and regenerative changes were present in the liver parenchyma. The cells were swollen, had a more or less homogeneous eosinophilic appearance, and were sometimes vacuolated. The very large, vesicular nuclei with marginated chromatin had prominent spherical nucleoli (Fig. 4). Unlike the circumscribed focal necrosis, characteristic of a variety of avian liver conditions, the present disease was manifested by diffuse necrosis of practically all the perisinusoidal regions. This affected especially the "ends" of the liver cords where there was evidence of true necrosis. This indicated that the peripheral areas of the parenchymal sheets were most severely involved. These areas, which were distributed diffusely throughout the liver, were characterised by the presence of cell debris, karyorrhexis and karyolysis. Haemorrhage was not observed but venous congestion was marked.

In early cases the degenerative and necrobiotic changes dominated the picture (Fig. 3) but were superseded in the more advanced stage by regenerative processes. In such advanced cases groups of regenerating liver cells were distributed throughout the organ (Fig. 1). Although the regeneration appeared to originate at the periportal region, no evidence of a true nodular regeneration could be seen. The groups of regenerating cells were characteristically arranged as distinct tubules (Fig. 2) and in some instances almost the entire section was composed of such tubules (Fig. 1). The regenerating cells were markedly basophilic, often contained large vacuoles, and were sometimes multinucleated but contained few mitotic figures (Figs. 2 and 3) despite the obviously active proliferation. Islets of necrobiotic parenchyma were scattered between the groups of regenerating liver cells (Fig. 4). While the sinusoidal reticulo-endothelial cells were

markedly hyperplastic (Fig. 1), there was only a moderate localised increase in collagen and reticulum fibres. The bile ducts were only moderately hyperplastic and some of the larger ones were hypertrophic showing multi-layered epithelium.

Although a few heterophils and mononuclear inflammatory cells such as plasma cells and lymphocytes were sparsely scattered through the affected livers, there was no evidence of a true inflammatory reaction or focal cellular infiltration. The blood vessels were congested but showed no other abnormality.

Kidneys

Apart from a mild intertubular oedema present in some cases, only the glomeruli and the proximal convoluted tubules showed any significant changes. The glomeruli showed a very pronounced thickening of the capillary basement membrane (Fig. 5). Practically every glomerulus in the section was affected to some degree. In a single section the severity of the lesions ranged from moderate thickening of the basement membrane of 1 capillary loop in 1 glomerulus to a pronounced thickening of practically all the membranes in another. These membranes were usually dense and stained deeply with P.A.S. (Fig. 5), but in some instances they were of a looser texture (Fig. 6) and in some others nodular non-laminated thickenings were present along the course of the capillary walls (Fig. 5). Ischaemia was noticeable particularly in the more seriously affected glomeruli (Fig. 6). P.A.S.-positive spherical granules of varying size were, from time to time, observed within the Bowman's capsules (Fig. 6). While these membranous lesions were very prominent, the glomeruli were of normal size and there was no evidence of any proliferative changes typical of avian glomerulonephritis (Siller, 1959a).

In sections stained with P.A.S., tubular lesions, when present, were striking but sparsely distributed. Those kidneys affected with membranous glomerulonephritis also showed hyaline droplet nephrosis. The proximal convoluted tubules were usually affected, although the collecting tubules sometimes showed similar lesions. On the other hand, the distal convoluted tubules were invariably normal. The epithelium of the nephrotic tubules was swollen. In those severely affected the cytoplasm was completely filled by P.A.S.-positive hyaline droplets of varying size (Fig. 7). This dense accumulation of granules obscured the nuclei. Although most were normal (Fig. 7), a few nuclei in the affected epithelium showed such degenerative changes as moderate pyknosis and margination of the nuclear chromatin. In more mildly affected tubules small droplets only were present. It would appear that these first develop at the apical part of the epithelial cell, immediately below the brush border lining the lumen. The blood vessels of the kidney were normal.

Duodenum

There was evidence of a very heavy catarrhal enteritis. Large portions of mucosal epithelium, otherwise normal, were desquamated and lay free in the lumen of the gut. In a number of sections practically all the mucosa was desquamated leaving only the Brunner glands of the submucosa intact. In some cases there was a very characteristic coagulative necrosis of groups of villi similar to what one would expect to see in an infarct, although no thrombosis was discovered. There was only moderate secondary inflammation in the mucosa and submucosa; no parasites could be found in the sections.

Heart

Mild granular myocardial degeneration was distributed fairly even throughout the heart. Somewhat more marked was the subepicardial oedema, which was prominent in the coronary region and extended some short distance into the adjacent myocardial tissue. A rather loose type of fibrous tissue containing sparsely distributed myocardial fibres is normally present in avian hearts at the base of the aorta, Siller (1958) has suggested that this represents the remains of the endocardial cushion. In the oedematous hearts of these turkey poults this fibrous tissue showed a considerably looser structure and large vacuoles, presumably due to oedema.

Other organs

Pancreas and brain showed no deviations from the normal.

Discussion

Campbell (1955-57) has pointed out that the avian liver does not readily react to irritant substances by the development of true cirrhotic changes. In fowls, at any rate, the connective tissue response appears to be much more moderate than in mammals. In mammals such a severe liver degeneration as was observed in the present cases would undoubtedly have initiated considerable fibrosis. The moderate increase in the connective tissue together with the bile duct hyperplasia must, however, be interpreted as evidence of a cirrhotic process. This is supported by the report of Wannop (1960), who describes mild cirrhosis in similarly affected turkeys.

The avian liver, like that of the mammal, has a great regenerative ability. Saphir (1959) stated that in man the cords of regenerating liver cells are a "perfect imitation of those of the normal liver." In birds regenerating liver cells tend to assume the above-mentioned tubular appearance which suggests a reversion to the embryonic type. Campbell (1960b) described a similar tubular regeneration in the liver of fowls experimentally dosed with seneciphylline. He compares these structures with embryonic liver tissue. In some mammals neoplastic liver tissue, such as occurs in hepatocellular carcinomata, also tends to assume the embryonic tubular appearance (Berman, 1951). The turkey livers showed no evidence of tumour formation, but the similarities between neoplastic and actively regenerating tissues are often very marked and the borderline may not be easy to draw.

The lumina of these tubules of regenerating parenchyma represent an enlarged or dilated bile capillary. The normal avian liver has a proportion of the cell cords which can appear almost circular in section with the apices of the cells pointing towards the centre where the bile capillary is situated. In normal birds these circular cords have no obvious "lumen," such as is seen in the regenerating "tubules." There is no doubt that these "tubules" are not hyperplastic bile ducts but are, in fact, regenerating parenchyma

although at first sight the differentiation may not be easy. It cannot be certain, however, whether these regenerating cells were not derived from bile duct epithelium. Such a possibility is contested by Cameron (1952) and by Willis (1958) and it seems generally accepted that regenerating cells originate from still viable hepatic tissue (Maximow & Bloom, 1952).

Some of the regenerating cells showed evidence of mild retrogressive changes, which was not comparable in severity, however, with the degenerative process seen in the liver parenchyma. Both degenerative and regenerative processes were obviously highly active at the time of death and it is therefore reasonable to assume that the regenerating liver cells were also subjected to the effects of the toxic agent. Yet the amount of degeneration which had taken place in the regenerating cells was minimal. This confirms the observations of Cameron (1952) and Campbell (1960a), that regenerating cells are much more resistant to poisons.

Both the retrogressive and regenerative processes seen in these livers suggest a toxic basis. The picture is in a number of respects similar to that of ragwort poisoning in fowls (Campbell, 1955-57 and 1960b). It does seem, however, that in these turkey poults both processes are much more acute; despite the massive regeneration up to 90 per cent. of the cases died, whereas in experimental Senecio poisoning in fowls survival is frequent.

If the arrangement of the reticulum network of the liver is altered during the retrogressive phase (as was the case here, see Figs. 8 and 9), the orientation of the regenerating liver cells, in correct relation to the sinusoids and central veins, is hindered. This may cause interference with the normal portal circulation to give a "portal hypertension with all its complications" (Saphir, 1959). Ascites is a frequent symptom in these turkey poults; the destruction of the normal liver tissue and its disorientated regeneration may be contributory. Ascites was also observed by Campbell in fowls poisoned with ragwort.

In fowls, glomerulonephritis is characterised in the acute stage by a thickening of the capillary basement membranes and by both epithelial and endothelial proliferations within the glomeruli (Siller, 1959a). In the turkey poults, on the other hand, the glomeruli showed neither enlargement nor proliferative changes. The membranous lesions were very much more severe than in fowls and are comparable with the changes observed in human membranous glomerulonephritis. This condition is characteristic for eclampsia and lipoid nephrosis (Allen, 1951). It should be mentioned that the nodular thickenings of the turkey glomerular capillary basement membranes bear a superficial resemblance to the Kimmelstiel bodies seen in cases of human diabetes. However, the latter are usually laminated, while in the poults the nodules have a more or less homogeneous although somewhat pitted appearance. There was, of course, no histological evidence of diabetes; the pancreas was normal and diabetes is unknown in gramnivorous birds although it may be noted that the normal blood glucose level is more than twice that in mammals (*cf.* Erlenbach, 1938; Bell, 1957).

It has been found that, in fowls, diffuse proliferative glomerulonephritis may be a sequel to some forms of liver cirrhosis (Siller, unpublished data), but such strictly membranous lesions without proliferative changes appear not so far to have been recorded in birds. Liver damage causes a decreased inactivation of oestrogen by conjugation, and therefore accumulation of free oestrogen (Campbell, 1957). Proliferative glomerular lesions occur in fowls exposed to excessive oestrogen, regardless of whether it is of endogeneous or exogeneous origin (Siller, quoted by Campbell, 1960a). In such cases, however, the glomerular changes are not membranous but proliferative. It is unknown to what extent oestrogen participated in the development of the membranous glomerulonephritis of the present cases.

Hyaline droplet nephrosis in man is associated with various renal diseases such as membranous glomerulonephritis, lipoid nephrosis, and nephrosclerosis, and it occurs in tubular degeneration following chemical poisons, including certain sulphonamides (Allen, 1951).

It is noteworthy that most of the investigators, including the present authors, stress the macroscopic enlargement of the kidneys in this condition. Histologically the interstitial oedema was slight and not nearly so severe as in acute pyelonephritis of the fowl, in which the kidneys are greatly swollen (Siller, 1959b). On the other hand, in human lipoid nephrosis the kidneys are greatly enlarged (large white kidney).

The aetiology of this "new disease of turkey poults" is unknown. Stevens (1960) suggests that the liver lesions of this complex are similar to those of virus hepatitis in turkeys reported by Snoeyenbos *et al.* (1959) and Mongeau *et al.* (1959), who describe fatty change, focal parenchymal necrosis, foci of granulocytic and lymphocytic infiltrations and haemorrhage in the liver. Not one of these changes was observed in the present cases. Haemorrhage and foci of cellular infiltration were completely absent from the liver and there was no focal necrosis although diffuse necrobiosis was severe. Regeneration of liver tissue and renal lesions were both very pronounced but they appear not to be characteristic for turkey virus hepatitis in which, however, pancreatic lesions occur. (The very prominent nucleoli of the degenerating liver cells should not be confused with virus inclusion bodies.) Wannop (1960) also denies the identity of these 2 conditions.

An alimentary toxaemia in chickens presumed to be due to a toxic factor in nutritional fat was described by Sanger *et al.* (1958). The main macroscopic findings were hydropericardium and mottled scarred livers. The histological features consisted of large areas of necrosis, petechiation, and cirrhosis of the liver, but regeneration was not observed. In the kidneys there was interstitial oedema, swelling of the glomerular tufts, erythrocytes within the nephron and tubular degeneration. The tips of the duodenal villi were necrotic and there was a subepicardial oedema with myocardial degeneration. There are some points of similarity, therefore, between this and the condition in turkeys under discussion, but judging from the, unfortunately rather poor, illustration in Sanger's paper, it is particularly

the liver and renal glomerular changes which will readily differentiate them.

It may be noted that 3 outbreaks of disease in broilers aged approximately 3 weeks, each one on separate premises and in different breeds, had showed the following macroscopic *post mortem* features. The carcases were in good condition but congested. The livers were enlarged and congested with scattered haemorrhages. The kidneys were very swollen with blanched areas, the congested blood vessels standing out in relief. The myocardium was severely congested and hydro-pericardium was present to varying degrees. There was catarrhal enteritis with congestion of the blood vessels. The intestinal contents were mucilaginous. Bacteriological and parasitological examinations produced nothing significant. Although the mortality figures were not recorded, they were not unduly alarming and in 2 flocks mortality subsided over 2 weeks. Later on, the growth rate was obviously uneven. Food consumption did not fall throughout the period when the birds were affected. No material from these broilers was available for histology.

Most investigators suggest that nutritional toxic factors may be responsible for the new disease (Stevens *et al.*, 1960; Smith, 1960; Wannop, 1960; Wiley, 1960). Blount (1960b) stressed the anorexia as due to unpalatability. Mann (1960) implicates the increased addition of the cereal milo in the poultry foods during the past year, but Blount (1960a) points out that some outbreaks of "X"-disease were definitely not associated with rations containing milo. Blount (1960b) lists the exhaustive but so far unrewarded search which has been, and still is being, made for a chemical toxin which may be responsible for this economically important disease.

In Flock 3, the presence of a toxic factor in the food was strongly suggested by the result of changing the food in order to provide rapid treatment with furazolidone. Many of the authors quoted above have noted the beneficial effect of a change of diet. A toxic aetiology is strongly supported by the *post-mortem* and histological findings. The catarrhal enteritis, along with the severe retrogressive liver changes resembling those produced by known hepatotoxic agents such as ragwort alkaloids, the hyaline droplet nephrosis, and myocardial degeneration support the concept of a toxic cause.

A meeting of research workers and representatives of the National Food Compounders was held at the Agricultural Research Council Headquarters on August 19th, 1960, to discuss this condition. Their conclusions, which appeared in THE VETERINARY RECORD (1960. **72.** 710) were: "It seems unlikely that any nutritional deficiency or excess *per se* could give rise to the rapid onset of symptoms and high mortality experienced. Therefore, one is driven to the conclusion that if the disease originates *via* the intestinal tract then it is probably by some form of pre-formed toxin."

The renal and hepatic lesions would undoubtedly account for the generalised oedema, a symptom closely associated in human medicine with lipoid nephrosis. It is noteworthy in this connexion that a diuretic treatment has had some success in outbreaks of this turkey disease (Swarbrick, 1960).

While the histological changes described above were constant in the cases examined, Wannop (1960) records some differences in the macroscopic *post-mortem* findings of his cases. He did not observe generalised oedema, but he saw haemorrhages in the liver and pancreas. It may be that the autopsy findings may not be identical in all the outbreaks. Clinical symptoms, too, appear to be variable, which suggested to Wannop that there may be 3 forms of a single disease entity.

The isolation of *Salmonellae* in flocks 2 and 3 would appear at first sight, to confuse the picture, but it must be remembered that turkeys frequently are carriers of these organisms. Furthermore, in flock 2 no *Salmonellae* were isolated from the White birds which had died and in which the histological changes were characteristic for this condition. In this flock, the Bronze birds in which *Salm. saint paul* had been isolated originally continued to die even after they were treated with furazolidone. These, and the fact that the histological changes were not typical for salmonellosis, indicate that the cause of death in these outbreaks was not due to the concomitant infection with *Salmonella*.

In view of the predominant enteritic and hepatotoxic changes it is suggested that this condition be termed "an entero-hepatic syndrome" of turkeys.

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Anaesthesia and Surgery in Cage and Aviary Birds (I)

BY

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Introduction

MUCH has been written in the lay periodicals concerning the ailments of cage, aviary and sporting birds and their treatment by breeders, fanciers and naturalists. Most accounts are sketchy and fallacies abound. Veterinary and other scientists have produced a sparse literature most of which relates to one facet of the subject and often only reports a single case history. Few authors have a broad general picture of disease in the field ; there is no comprehensive text-book which covers the range of diseases met with, nor is there one which includes all the species which are numerically significant in this country. The following pages are intended to serve as an outline of the commoner conditions recorded, including some principles and details of their possible treatment.

It must, however, be far from complete because of the relative lack of interest shown by veterinary surgeons towards bird pets in the past. There is undoubtedly a place in veterinary practice for young graduates whose natural interest inclines to these creatures to specialise in the subject. Certainly there must be an enormous amount of unwritten knowledge possessed not only by veterinary surgeons but also by breeders and fanciers which, if sought and collated, would form a most valuable addition to the literature.

Part I.—Anaesthesia

A feature of birds is that, size for size, they have a significantly higher basal metabolic rate than have mammals (Sturkie, 1954), and in the smaller varieties body temperatures of at least 112° F. (Gray, 1936) are reached. This must in part account for the extremely rapid absorption, detoxication and elimination of drugs, and in no respect is this more clearly demonstrated than with volatile and gaseous anaesthetics in which toxic quantities may be absorbed in a few seconds. Another important factor in this respect is the anatomy of the respiratory system (Bradley, 1938 ; Sisson & Grossman, 1945 ; Sturkie, 1954), viz. the long trachea, the " straight-through " bronchi to the air sacs, and the air spaces in the long bones, the laterally disposed tertiary bronchi with their absorptive extremities, and the fact that a given unit volume of air effects gaseous exchange twice in each respiratory cycle. It is this very sensitive mechanism which has been exploited in the employment of canaries in the detection of poisonous gases in wells and mines.

Criteria of Planes of Narcosis and Anaesthesia

Narcosis

Light narcosis. The main signs are those of sedation ; the bird is lethargic and more tolerant of being approached. The eyelids tend to droop.

Medium narcosis. The feathers become ruffled. The head hangs progressively lower until it reaches the floor but the bird can be easily roused. Only a little struggling occurs when threatening movements are made near the bird's head or when it is picked up.

Deep narcosis. There is little or no response to sound vibration but there may be some attempt at co-ordination when the bird is placed on its back. Purposeful voluntary movements (fluttering) are seen when painful stimuli are applied, and in some cases shrill cries are emitted after the stimulus is discontinued. The latter is more noticeable with barbiturate narcosis. Respiration is usually fairly rapid, regular and deep but, after stimulation, it may become irregular.

Anaesthesia

Light anaesthesia. No response is provoked by vibration or postural changes but, although no voluntary purposeful movement is performed, all reflexes, palpebral, corneal, the cere and pedal are present and brisk. Pedal response may continue after stimulation ceases.

Medium anaesthesia. The palpebral reflex is lost ; corneal and pedal reflexes are sluggish, delayed and intermittent. Respiration is slow, deep and regular. Most operations can be performed at this level of anaesthesia.

Deep anaesthesia. Corneal, digital, cloacal, buccal and cere reflexes are absent. Respirations are very slow but usually regular. If anaesthesia is further deepened the respirations become slower and shallower and finally cease.

In debilitated, toxic, obese or cardiovascular cases, Cheyne-Stokes type respiration may precede death in any plane of anaesthesia, or in a healthy bird when a highly toxic gas such as chloroform is used.

Gaseous and Volatile Anaesthetics

(See Buchanan & Sykes, 1960 ; Gray, 1936 ; Jordan, Sanford & Wright, 1960 ; Snow, 1858.)

Chloroform

This is an extremely potent anaesthetic and in the majority of species is so toxic that it is better regarded as an agent of euthanasia rather than as an anaesthetic. Nevertheless, some authorities (Gray, 1936) claim to have maintained anaesthesia with chloroform for an hour or more in the larger species of the parrot family and in pigeons. However, chloroform is *not* recommended for use in any species of cage or aviary bird. When given by mask it will kill a canary or one of the smaller finches in as little time as 3 seconds. Cardiac failure accompanies or precedes respiratory failure and thus attempts at resuscitation are of no avail.

Ether

This is a potent yet safe anaesthetic. It may be

administered from a pad of wool held in the palm of the hand or from cotton wool contained in a loose-fitting mask or jar. Ether used in a Boyle's apparatus with 50 to 250 ml. oxygen flow per minute produces excellent anaesthesia in almost all cases. Bubbling the oxygen through the ether speeds induction, but passing it over the liquid is generally sufficient for the maintenance of anaesthesia. Salivation or naso-lachrymal secretion is not a noticeable feature even in dyspnoeic cases although Gray (1936) recommends the subcutaneous administration of atropine in doses ranging from 1 / 2,000 gr. in canaries to 1 / 200 gr. in pigeons, before ether. Deep narcosis to medium anaesthesia is usually attained in 10 seconds to 2 minutes, according to species and individual variation, although in the larger parrots the narcosis is insufficient for surgical considerations. In these birds a parenteral narcotic such as pentobarbitone sodium may be used as a premedicant.

Nitrous Oxide

When used alone in concentrations of up to 90 per cent. of the gas with oxygen this agent seldom provokes more than narcosis of light to medium depth, and it is quite inadequate for surgical interference. It can thus be considered only for augmenting the effect of other anaesthetics.

Cyclopropane

Using a 25 to 45 per cent. mixture of this gas in oxygen, graded planes of anaesthesia from deep narcosis to deep anaesthesia can be induced in ½ to 5 minutes and can be safely maintained without weakening the mixture for at least an hour. The mixture is given *via* a glass or transparent acrylic cylindrical mask of a diameter sufficient to allow the feathers of the head to make a loose seal yet prevent the head turning. In the budgerigar and canary this mixture presents a simple, easily-managed and predictable inhalation anaesthetic.

*Halothane**

On account of the high potency of this drug and the great range of tolerance of the various species of bird in health and disease, an open mask method using halothane-soaked cotton wool is not recommended. Good anaesthesia is, however, obtained in budgerigars with a " Fluothane "† bottle in an open circuit Boyles apparatus using a loosely fitting mask. It is strongly recommended that a standard flow-rate of oxygen of between 50 and 200 ml. per minute be used ; to induce anaesthesia the flow diversion lever setting should be on " 5 " or less, increasing by 1/10 every 2 minutes until the desired plane is reached. It is essential thoroughly to fill all tubing at the induction concentration for a full minute before inserting the bird's head into the mask on account of the dire effects of residual higher concentrations. It is possible deeply to anaesthetise a bird in 45 seconds with the lever setting in the 10th position and a further half minute at this setting can be fatal. Properly controlled, however, anaesthesia of an hour's duration can safely be maintained with the weaker mixtures.

* Fluothane, Imperial Chemicals (Pharmaceuticals), Ltd.
† British Oxygen Gases, Ltd.

Parenteral Anaesthetics

(See Albrecht & Forde, 1956 ; Buchanan & Sykes, 1960 ; Gandal, 1956 ; Jordan, Sanford & Wright, 1960.)

Pentobarbitone Sodium

The use of pentobarbitone sodium in birds exemplifies the previous statement regarding the speed with which birds detoxicate and eliminate drugs. In this drug we have an anaesthetic which has a duration comparable with that of thiopentone sodium in the dog or cat when used on the larger parrots or pigeons, and an even shorter duration when used in the budgerigar or finch family. Response is very variable amongst the smaller species, especially the budgerigar, and this—although partly due to measurement inaccuracies of the minute quantities used—is largely affected by the obesity and general health of the bird.

The route of administration (except in larger species where intravenous injection into the brachial vein is not difficult) may be intramuscular, intraperitoneal or subcutaneous. With the first two routes the full effect (which with a unit dosage of 4 mg. per 100 g. may range from medium narcosis to full anaesthesia or even death) may be expected in from 30 seconds to 3 minutes in the small finches, canaries and budgerigars, and in from 1 to 5 minutes in the larger birds of the parrot family and in pigeons. With the subcutaneous route, maximum depth is reached within 10 minutes in the smaller birds, and in from 5 to 30 minutes in the larger species.

Death may be due to individual susceptibility to barbiturates or to increased vascularity of the injected site. More often, however, it is due to technical errors such as injecting into the abdominal air sacs or into an enlarged liver, or to puncturing one of the larger venous sinuses in the pectoral muscles. It is therefore recommended that :—

(*a*) The subcutaneous route only be used. The disadvantages of the method are (i) somewhat slower onset of action, and (ii) rapid elimination and detoxication which may lessen the depths of anaesthesia.

(*b*) The skin of the neck should be used.

(*c*) A preliminary test dose of half the computed dose be followed in 10 to 20 minutes by a reassessed dose when necessary.

(*d*) In the case of a shocked or debilitated bird where some doubt exists as to its tolerance of the barbiturates once light or medium narcosis has been attained with the test dose, anaesthesia should be induced by ether or by some other safe inhalation anaesthetic.

(*e*) The concentration of the solution used should not be less than 60 mg. per 10 ml. for otherwise the volume is too great for safe injection. A 1 ml. syringe graduated in 1/100ths is advised for birds of less than 200 g.

Magnesium Sulphate—Chloral Hydrate Mixture

(See Jordan, Sanford & Wright, 1960.)

Trials have been carried out with mixtures of these well-known narcotic substances for the purposes of

anaesthesia and euthanasia. They show that a solution containing 5 per cent. W/V chloral hydrate and 2·5 per cent. magnesium sulphate in distilled water provides a prenarcotic or light anaesthetic which can be injected subcutaneously into the neck, without appreciable local reaction, at the rate of 0·6 to 1·0 ml. per 100 g. bodyweight. The onset of narcosis is slow by avian standards ; it commences after some 3 minutes but does not reach maximum depth for another 12 to 30 minutes. Pentobarbitone at a reduced dosage of 0·1 to 0·4 of the computed barbiturate dose of 4 mg. per 100 g. can be given after 20 to 30 minutes and light to deep anaesthesia is reached in a further 5 to 15 minutes. This is too slow for most purposes but it is useful for prolonged surgery and safer in cases where thermocautery is to be used. Anaesthesia lightens slowly after 20 to 40 minutes but birds are well sedated for some hours and are usually still subdued 12 hours later.

It is dangerous to inject this mixture and the barbiturate simultaneously as the narcosis due to pentobarbitone (reached in perhaps 5 to 10 minutes) deepens imperceptibly over the next 10 to 20 minutes. Further anaesthetic at this stage is usually fatal because the magnesium sulphate and the chloral hydrate have not yet been fully absorbed. The mixture should be used with caution, especially in very small birds, and in the larger varieties, in weak or shocked subjects.

Local Anaesthesia

(See Buchanan & Sykes, 1960 ; Gray, 1936 ; Keymer, 1958b ; Jones, 1956.)

This has been used and advocated by some workers who report the method to be effective though of short duration. However, the safety of local anaesthetics is in some doubt, especially when injected into deeper and more vascular tissues. Except for small lesions, therefore, a short-acting general anaesthetic is preferable.

When a local anaesthetic is employed a 2 per cent. nupercaine solution or a 2 per cent. procaine solution is suitable, but the former has been known to cause temporary partial paralysis of the legs when used in poultry in the wall of the cloaca (Buchanan & Sykes, 1960). Ethyl chloride spray is useful in such conditions as prolapse of the rectum and prolapse of the oviduct.

Conclusions

For short interventions ether or cyclopropane alone are safe and rapidly effective. For longer procedures cyclopropane is still suitable, but for surgery of over 30 minutes duration, light narcosis induced by pentobarbitone or chloral hydrate and magnesium sulphate mixtures, deepened by inhalation anaesthetic, is preferable.

The use of local anaesthetics alone is seldom indicated, but they may be used to prevent struggling in a lightly narcotised bird which is too ill to be deeply anaesthetised.

Post anaesthetic excitement which is sometimes seen is dangerous because of the injury and haemorrhage which haphazard, violent movement can cause. A cylinder of paper or thin card lightly rolled round and fixed with adhesive tape serves to immobilise and calm the bird. (This is also useful for weighing birds.) The bird should not be returned to the cage or aviary until it is fully conscious. It should be kept in a box or room free of draughts and at an even temperature of at least 70° F., and preferably at from 80° to 85° F. Infra-red heating has been advised, but a well insulated and ventilated box suspended over a radiator, or an electric lamp enclosed in a second box, is adequate.

Surgery : General Principles

The widely held belief that cage and aviary birds, especially the smaller species, are particularly susceptible to the hazards of handling and surgical interference, springs from our superficial knowledge of these creatures. We are called on to deal with many species which differ not only in external morphology, but also in certain internal anatomical and physiological features (Matthews, 1949 ; Sturkie, 1954). For example, the crop is absent in some species—such as certain insectivores—and is rudimentary in a few grain-eating birds. Moreover, dietary requirements are so imperfectly understood that some species will develop irreversible abnormalities such as obesity on what is recorded as a suitable diet (Jones, 1956 ; Riddle, Nussmann & Benedict, 1932 ; Sellwood, Massey & Waterhouse, 1960 ; Taylor, 1958 ; Worden & Taylor, 1959).

Nevertheless the exercise of a gentle firmness in handling with an appreciation of the relative size of the patient and the robustness of its species, combined with a commonsense approach to surgical principles, permits a wide range of surgical procedures to be attempted. Some of the factors which influence the success of these interventions may serve as guiding principles to those contemplating operations on birds :—

(1) *Restraint*

To minimise fear, shock and the risk of injury to the bird, it should be approached slowly and deliberately (using stout gauntlets for the larger parrots, etc.) and grasped suddenly when the hand is within a few inches of the patient.

(*a*) The bird should be seized with first and second fingers astride the neck ; the palm should be held lightly against the dorsum of the bird so that the remaining fingers and thumb are free to form a loose cage round the body or to restrain a limb, the wings, etc. This method is applicable to all birds of less than a 100 g. and permits examination of the entire body by slight readjustment of the fingers. Strong lateral pressure on the neck prevents struggling or pecking.

(*b*) Grasping entirely with an almost closed fist is a method for the restraint of small finches of 15 g. or less. Adequate ventilation between the fingers must be allowed, and no pressure whatever must be put on the thorax. Slight movement of the thumb will restrain the head and permit the fingers to be opened for examination of the body.

(*c*) For restraint of the larger parrots, owls and the like, the approach is as in (*a*) except that the neck is best grasped with the whole of one hand while the

other hand seizes either both feet or both humeri, one or two fingers being placed between the wings to prevent dislocation or other damage. The bird can then be partially enveloped in a blanket in order to free one hand for examination purposes.

(*d*) Pigeons and other large soft feeders can be handled with little fear for the safety of the handler or the bird. The tail, wingtips and feet may be grasped together and this will allow most parts of the bird to be examined freely. Other methods employed include the hand astride the humeri, as detailed for the parrot or fowl, and encircling the anterior thorax and shoulders ; the latter is a useful method for abdominal, cloacal or hind limb examination.

(2) *Pain*

It would seem that the threshold of pain is generally higher in birds than in mammals. In this connexion massive trauma such as auto-evisceration and suturing or incision often produce little concern. The threshold of sensation, however, may not differ greatly from that of mammals, for the irritation of a strapped foot or loss of feathers may provoke vigorous self-interference. Certain procedures are resented more than others as evidenced by struggling, withdrawal of the part, or shrill alarm cries in some species—both in conscious or narcotised birds—when a painful stimulus is applied. Such sites and stimuli are pricking of the cere, scraping or clipping near the beak or eyes, marked pressure on the digits, and stretching of the skin or subcutaneous tissue as in blunt dissection.

(3) *Shock*

When birds are handled properly death from shock is rare, and is met with only in individual cases suffering from disease of the respiratory tract or from lesions causing pressure on respiratory organs. Common causes of death are excessive pressure on the trachea or thorax during handling and from the giving of medicines by the mouth. In diseased and debilitated cases handling augments the normal fear and death results from the over stimulation of a failing circulation. In a less severe case of illness, even in the canary and in the smaller finches, death from handling is rare ; on the other hand, a freshly captured wild bird, a very obese bird or one on a diet deficient in certain respects may be more prone to sudden death when handled.

(4) *Haemorrhage*

If it is accepted that the circulating blood volume does not exceed 10 per cent. of the bodyweight (Sturkie, 1954), it is not surprising that a rapid visible bleeding of some 5 drops in as many seconds is often sufficient to cause cardiac arrest in a budgerigar or canary for this blood loss represents some 10 to 15 per cent. of the total volume, and the fall in blood pressure must be significant. The vasoconstrictor mechanisms and withdrawal of tissue fluids cannot, it would seem, keep up with the rapid loss of blood. Alternatively, a greater degree of bleeding occurring more slowly as, for example, over an operative period of 20 minutes or so, is tolerated better and mortality is much lighter.

(5) *Operative Techniques*

In view of the high vascularity of many of the common operation sites it is recommended that :—

(*a*) A small primary incision be made, the tendency of the part to haemorrhage ascertained, and the bleeding controlled with forceps, ligature, swabs or thermocautery.

(*b*) The incision should then be enlarged by inserting a Spencer Wells artery forceps and by opening the jaws forcibly within the wound until the latter is of adequate size. The subsequent layers are similarly treated.

(*c*) Subcutaneous structures should be removed entirely by blunt dissection if possible, and any cutting should be carried out with scissors and not with a scalpel.

(*d*) The smallest and lightest instruments should be used and forceps should not be left hanging unsupported from bleeding points owing to the fragility of avian tissues.

(*e*) Suturing, especially if there is a marked vascularity of tissue, should be carried out with fine atraumatic (intestinal) needles on " 00 " or finer gut. In pigeons and parrots No. 2 and No. 4 twisted silk or nylon is preferable for the skin and should be used with the smallest suture needles.

(*f*) A useful emergency haemostatic agent is a clamp comprising a lady's spring hair clip. This is ideal for friable as well as vascular tissue and can be applied with one hand to the lips of the wound : the open ends of the clip can then be held together by ligature.

(6) *Infection*

Avian tissues are very resistant to post-operative pyogenic infection. This must not, however, be an excuse for slipshod methods of surgery. With the bird lightly anaesthetised, the feathers in the operative region must be plucked and the site thoroughly washed and painted with surgical spirit. A small cloth with a 1-in.-square hole in its centre is suitable to cover the bird and to expose the site.

(7) *Interference with Wounds*

To prevent interference with wounds in the larger members of the parrot family whose powerful beaks can rapidly create havoc in an abdominal or limb wound, an Elizabethan collar formed from soft aluminium sheeting is the best method.

(8) *Environmental Temperature*

In a normal bird, sudden and severe changes of temperature in unprotected cages can lead to serious illness (Sturkie, 1954). In a bird recovering from an anaesthetic and a surgical operation these changes assume vital importance. The range of temperatures suitable for most birds lies between some 60° and 85° F. If these lower or upper critical temperatures are exceeded the bird responds either by shivering or by panting ; both of these reactions require energy and in a sick bird they are calculated to increase shock and to lessen the chances of survival. A suitable recovery room or cage temperature is 80° F.

(*Part II will be published in next week's issue of* THE VETERINARY RECORD.)

Current Literature

ABSTRACTS

Attempts to Demonstrate the Transmissible Agent of Scrapie in Experimentally Infected Goats by Means of Fluorescent Antibodies. MOULTON, J. E., & PALMER, A. C. (1959). *Cornell Vet.* **49.** 349.

Attempts by conventional methods to determine the cause of scrapie have been, so far, unsuccessful, and antibodies to scrapie have not as yet been demonstrated. However, the authors decided to search for the agent that causes scrapie, using a fluorescent antibody technique, in those areas of the brain where pathological changes are found.

Fluorescent conjugates were prepared from the serum of a goat affected with scrapie, and the sera of rabbits given multiple inoculations of cerebrospinal fluid from goats affected with scrapie. Tissue for examination was taken from the medulla of 5 goats in the terminal stages of scrapie, and sections were stained with fluorescent conjugate, and by haematoxylin and eosin.

Vacuolated neurons, often with intravacuolar material, were found in numbers far in excess of those found in normal goats, but fluorescing antibodies were not found either in vacuolated or non-vacuolated neurons, or in any other tissue elements.

Although useful comparisons have been made between the microscopic appearances of diseased and healthy medullae, it is felt that tissue culture methods might be more productive of results and might eliminate some of the difficulties inherent in the study of a disease which takes from 4 to 24 months to manifest itself in sheep, and is apparently not harmful to small laboratory animals. I. W. J.

Virus Abortion in a Goat Herd (Translated title). STAUB, H. (1959). *Dtsch. tierärztl. Wschr.* **66.** 98.

Two female goats were housed in a building. In the winter 1956-7 some sheep occupied the same building, and were sold in 1957. In the spring of 1957, 1 goat aborted; no examination of the foetus was made. In March, 1958 the second goat aborted. Bacteriological examination of the foetus was negative. Smears of foetal fluid showed virus elementary bodies of the psittacosis-lymphogranuloma group, similar to those of contagious abortion in ewes (already confirmed in Germany). The complement fixation test using an ornithosis antigen was positive for both goats above a titre of 1:40, negative for 18 control goats and an in-contact cow. There is a strong presumption that infection originated from infected sheep. In this event goats can play a part in spread of the disease.

Tranquillisers (Megaphen, Combelen, Decentan) in the Treatment of Oesophageal Obstruction in Cattle (Translated title). STOBER, M., & RIEGER, TH. (1959). *Dtsch. tierärztl. Wschr.* **66.** 38.

Twenty-two cases in the Hanover cattle clinic, most of them previously unsuccessfully treated, are described and tabulated giving details of duration of obstruction, site, grade of tympany, cause, nature of unsuccessful treatment, instrument used for removal, and degree of excitement observed in the patient. These 22 cases excluded others which were successfully treated at the clinic without recourse to tranquillisers. Good results were obtained in all these cases following intravenous injection, when the obstruction could be moved on without any particular difficulty, due to the sedative effects of the drugs and the relaxation of the smooth musculature of the oesophagus. Three animals became recumbent during or following removal, but this was of no consequence. The method is recommended for further use. A. D. W.

An Effective Canine Distemper Tissue Culture Vaccine. YORK, C. J., BITTLE, J. L., BURCH, G. R., & JONES, D. E. (1960). *Vet. Med.* **55.** 30.

The authors adapted an egg attenuated strain of canine distemper virus to grow in chick embryo tissue culture and this virus was used to produce a vaccine. It was found that an average of 3.5 T.I.D. (tissue infective doses) were required to induce antibody formation as compared with 50 to 250 E.I.D. (egg infective doses) of the same strain before adaptation to tissue culture. It was found that an increase in virus quantity in the vaccine although inducing earlier antibody production did not affect the ultimate titre of antibody.

Puppies vaccinated at 9 weeks old developed an immunity equal to that obtained with egg vaccine, but when a second dose of vaccine was given 4 to 6 months later this immunity was boosted to many times the titre obtained with egg vaccine. Despite the great antigenicity of the vaccine it is claimed that there is no interference between the distemper strain and concurrently administered live hepatitis virus vaccine.

It is suggested that the greater efficacy of the tissue culture vaccine was due either to the selection of a highly antigenic strain by adaptation to tissue culture, or that the low protein content of the tissue culture vaccine cut out the inhibiting effect of non-specific materials and hence led to a more satisfactory immunisation. R. F. G. S.

Mammary Excretion of Sulphonamides. RASMUSSEN, F. (1958). *Acta pharm. tox. Kbh.* **15.** 139.

The author describes experiments which show that the reason why there are different concentrations of certain sulphonamides in the blood and milk lies partly in the fact that these sulphonamides have different *p*K values and partly because these compounds are not bound equally on the proteins.

It is claimed that the blood-milk barrier is permeable solely to the unionised forms of these compounds but the ratio of these concentrations in milk and blood is constant for each compound provided the *p*H of the milk is constant. The ratio of the milk to blood concentration will increase with an increase in the *p*H of the milk and this is linked to the varying *p*K values of the sulphonamides the ratio being lowest with compounds with low *p*K values.

By calculation, using a simple formula derived from the *p*K value of the compound and the *p*H of the milk and plasma, it is possible to determine the ratio for each sulphonamide and these have agreed so closely with the ratios found experimentally that it is reasonable to assume that this diffusion equilibrium established across the blood-milk barrier must be associated with the non-protein-bound and unionised portions of the sulphonamides. C. D. W.

Extracting Canine Teeth of a Bear. FOWLER, M. E. (1960). *J. Amer. vet. med. Ass.* **137.** 60.

The author describes the extraction of the 4 canine teeth from a 20-month-old Malayan sun bear weighing 75 lb. With modesty, Dr. Fowler says "Restraint and anaesthesia are always a problem in surgery on wild animals." He describes how the bear was placed in a small cage, and when it reached out for some grapes, its arm was secured and a tourniquet placed above the elbow. Eleven grains of pentobarbital sodium was injected intravenously into the cephalic vein and the bear remained anaesthetised for 2 hours.

As in the case in many wild animals with ferocious canine teeth, it is impossible to remove them by traction. Dr. Fowler therefore employed canine dental elevators, chisels and forceps. After incising the gum along the length of the tooth, the bony plate lateral to the alveolus was removed by chisel and the teeth were levered out of their socket using the dental elevators.

At the close of the operation the bear was beginning to recover from its anaesthetic, and he was placed in a cage in a warm room and made a straightforward recovery.

Seven days post-operatively the animal received a soft diet. O. G-J.

Genetics of Dieldrin Resistance in *Lucilia cuprina* Wied. SHANAHAN, G. J. (1959). *Nature, Lond.* **183.** 1,540.

Shanahan crossed a single resistant male *Lucilia cuprina* with 10 susceptible female flies and used a discriminating dose technique to study the susceptibility of the progeny to dieldrin. Results of these tests indicated that dieldrin resistance in this insect is due to a partially dominant single gene. J. C. W.

A Clinical Review—Navicular Disease. BISHOP, H. W. (1960). *J. RAVC.* **31.** 61.

The 22 cases quoted by the author show that the treatment is of value in a considerable number of cases, and should be an encouragement to others. H. A. C.

Investigations into the Reliability of the Whiteside Mastitis Test and the California Mastitis Test. (Translated title.) BLOMBERG, H., & GASTRIN, B. (1960). *Nord. VetMed.* **12.** 293.

The authors investigated the best laboratory methods for locating herds and cows with chronic streptococcal mastitis, methods which would be suited to large scale field eradication schemes. The Whiteside mastitis test (WMT) and the California mastitis test (CMT), a modified WMT, are chemical tests to assess the number of cells in a sample; they were compared with cell counts and bacteriological culture. 1,985 bulk milk samples were taken from 372 herds; in the same herds 2,353 cow samples (milk from all quarters) were examined. Results are presented in a table with an English caption. In general the CMT was slightly better than the WMT. 66.9 per cent. of cow samples gave the same results with the CMT as bacteriological examination and 74.8 per cent. of bulk samples gave the same results. The authors think that neither of the 2 chemical tests nor the cell count method is sufficiently accurate for general use in locating the presence of chronic streptococcal mastitis on either an individual or a herd basis.

The Use of Sheet Plastic in the Form of a Tube as a Sterile Glove and for Packaging in Veterinary Practice, (Translated title.) KNUDSEN, O. (1960). *Nord. VetMed.* **12.** 301.

The author points out that the use of long-sleeved, sterile gloves is indicated on occasion in large-animal practice. However, the difficulty in sterilising these gloves results in the promptings of the practitioner's "aseptic conscience" going unheeded. A novel form of sterile "glove" has been used for a year with general satisfaction by the veterinary surgeons (presumably at least 5) and veterinary students (presumably about 30) working at the Ambulatory Clinic of the Royal Veterinary College in Stockholm. Nine inch wide rolls of thin plastic sheeting in tube form, sterilised in manufacture, are used. Its use as a glove is illustrated in 4 pictures with English captions. To keep the roll sterile a knot is tied beyond the section needed before it is cut off. The plastic tube has been used as a sterile glove for: (a) removal of retained placenta, (b) palpation of cervix and uterus, and (c) minor surgical interferences. It has also been used as packing for: (a) sterile instruments, (b) bacteriological samples, and (c) contaminated equipment. As with rubber gloves it takes some time to get used to working with the plastic glove.

Parasitic Bronchitis in Cattle. (Translated title.) LARSEN, H. E. (1960). *Nord. VetMed.* **12.** 373.

To test the effect of 2 methods of treatment of parasitic bronchitis, affected animals were divided into 2 treatment groups (44 and 45 animals) and 1 control group of 58 animals. They varied from less than 1 year to 16 years old. Faecal samples were taken before and after treatment and records of clinical examinations were kept. The animals were housed during the experiments. 45 cases were treated with cyancethydrazid (Helmox and Dictycide) and 44 cases with chenopodium oil as an aerosol (Ascaridol Knoll). The author concludes that the course of the disease in the 2 treated groups did not differ materially from the untreated controls. H. B.

Divisional News

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION

The winter general meeting of this Association was held in the Agricultural Department, King's College, Newcastle upon Tyne, on December 16th, 1960, at 2.30 p.m. The President, Mr. R. Muir, took the chair. There were 12 members and one visitor present. Four members sent apologies for absence.

Minutes

The minutes of the previous meeting were read, approved and signed.

Correspondence

(a) From the general secretary of the B.V.A. giving details of the proposed refresher courses on meat inspection. It was decided to hold a course, and if possible to arrange it in conjunction with the annual general meeting.

(b) From the North of England Branch B.M.A. confirming arrangements for a joint meeting on April 20th, 1961.

(c) From Messrs. A. F. Stewart and A. P. Kennedy resigning from the Association. Both had left the district. Their resignations were accepted with regret.

Election to Membership

Messrs. G. Tullis and F. D. Pette were elected and Messrs. G. Harris, G. Penman and R. P. Robson were proposed.

Election of Officers (to take Office at the A.G.M., 1961).

President: Mr. D. Buntain; Senior vice-President: Mr. R. Muir; Junior vice-President: Mr. A. A. Clarke; Hon. Secretary and Treasurer: Mr. G. F. Brown.

Clinical Discussion

Mr. J. D. Peele, who attended the Glasgow Refresher Course this year gave a résumé of some of the subjects studied there. These included displaced abomasum, repair of umbilical hernia, rumenotomy, brucellosis, early weaning, bloat nutrition in pigs, curled toe paralysis of chickens, the effects of vaccination in parasitic bronchitis, fillaroides in dogs, diabetes mellitus and insipidis, pancreatitis, hypomagnesaemia and hypocalcaemia, and trichomoniasis. Mr. Peele also demonstrated a modified operation for ear canker in dogs. A vigorous, informal discussion followed.

Other Business

Mr. J. P. Pickering wished to place on record the help given by the Foot-and-Mouth Disease Centres during the recent outbreaks. It was unanimously agreed to write to the Centres at Morpeth and Durham expressing the thanks of the Division.

It was resolved to recommence the Clinical Club mainly for the benefit of the younger members, and it was left for the next Council meeting to make the necessary arrangements.

Some discussion took place about the "Cheshire scheme" for swine fever vaccination, and the secretary was asked to find out the details.

THE SOCIETY OF PRACTISING VETERINARY SURGEONS

A general meeting of the Society was held jointly with the Scottish Branch at the Golden Lion Hotel, Stirling, on April 19th, 1960. The President, Mr. F. V. John, and Mr. K. P. Anderson, President of the Scottish Branch, jointly presided. Forty-six members and guests were present.

Apologies for absence were received from the following:—

Messrs. S. F. J. Hodgman; J. H. Parson; T. A. R. Chipperfield; F. A. Crowhurst; R. N. Phillips; J. B. Johnston; G. Wyse; G. N. Bushman; J. E. Johnson; A. L. Robertson; and Miss J. Osborn.

Minutes

The minutes of the general meeting held at the Great Northern Hotel, Lincoln, on March 30th, 1960, having been circulated, were agreed and signed.

Elections to Membership

Messrs. H. L. Evans; G. P. Doran; T. Shanks; J. A. Bunker; R. H. F. Palmer; J. H. Blanchard; R. L. Cox; H. B. Darbishire; M. I. Searle; B. G. Tiedeman; S. E. V. Mayes; G. McIlroy; A. M. Barker; D. Macleod; H. S. Taylor; G. A. Treanor; G. L. Barker; T. B. Walsby; E. M. Ll. Denham.

Nominations

Messrs. J. F. Birtwhistle; R. T. Parry; P. G. Grant; R. T. Knowles; J. E. Kneen; A. Hector; and H. A. G. Meikle.

The total membership as at April 19th, 1960, was 536.

Report on Behalf of the Economics Committee

Mr. A. Steele-Bodger gave a report on the Economic Survey carried out by the Society and made a detailed explanation of the veterinary costing system which the Society recommends.

During the ensuing discussion it became very apparent that the meeting was being held in Scotland; the assembled company had an obvious grasp of the general theory of economics if not of those aspects dealing with the finances of veterinary practice! The following subjects were raised: interest on invested capital, veterinary cartels, goodwill values, professional bonus payments, business consultants, renewing practice cars, costing formulae, detailed accounts, long-distance visits, scales of fees, the profession's worth in the opinion of the general public, radio-telephones, and the financial advantages of private practice.

Members and guests who took part were Messrs. Thirsk, Begg, Thomson, Oliver, Beattie, Smith, Spreull, Wilson, Andrew, Meikle, Chapman, Wood, and Blackburn.

News and Comment

THE C.V.O. KNIGHTED

At an investiture held at Buckingham Palace on February 7th the honour of Knighthood was bestowed upon Mr. J. N. Ritchie, C.B., Chief Veterinary Officer, Animal Health Division Ministry of Agriculture, and President of the Royal College of Veterinary Surgeons.

The ceremony was performed by Queen Elizabeth the Queen Mother in the absence abroad of The Queen. The new Knight and Lady Ritchie are seen outside the Palace immediately after the investiture.

THE NATIONAL INSURANCE SCHEME

From April, 1961, the new National Insurance scheme providing for a measure of graduated contributions and retirement pensions related to employees' earnings comes into operation. The system will apply to all insurable persons, unless they belong to another pension scheme in respect of which the employer has been allowed to contract out of the State scheme.

Suggestions have been made from time to time that the British Veterinary Association should sponsor a group scheme which would cover assistants in veterinary practice, leaving open to their employers the decision whether they should, on behalf of their assistants, contract out of the Government scheme on entry into any such B.V.A. scheme. This suggestion has been very carefully considered by the Home Appointments Committee and by Council, and thanks are due to the following four companies, who have a wide experience in this field, for their help in exploring the possibilities:—

S. H. Cannon & Co. Ltd., 6-8, Crutched Friars, London, E.C.3; Walter Herriott & Co. Ltd., Broad Street House, 54, Old Broad Street, London, E.C.2; Laurence Philips & Co. Ltd., 11-12, St. Swithin's Lane, London, E.C.4; and The Veterinary Insurance Agency, 1, Station Bridge, Harrogate, Yorks.

In general, these companies advised against opting out of the State scheme and Council came to the conclusion that it would not be practicable to inaugurate a national B.V.A.-sponsored scheme. The primary consideration which led to this decision was the fact that assistants normally became partners or principals within a relatively short period. A successful pension scheme must necessarily depend on a reasonably static group of participants.

The decision on the part of the B.V.A. not to institute its own pension scheme for assistants in no way implies that they do not consider it a wise policy for principals to provide some supplementary form of insurance for their assistants. On the contrary, they would be well advised to contact any of the firms whose names are given above, to determine what possibilities, applying to their own particular circumstances, are open to them. It should be noted that there is no legal barrier to participation in both the State scheme and any other form of group pension scheme at the same time.

SUBSCRIPTION TO "THE VETERINARY RECORD"

Having regard to the larger size of THE VETERINARY RECORD, and to the steady increase—unavoidable as it has been—in the cost of production, the Council of the B.V.A. has approved an increase in the cost of the journal *to non-members* from 2s. post free per week, to 2s. 6d. post free. The annual subscription for non-members will, therefore, become £6 10s.

It is with reluctance that this higher price has been decided upon, and it will not come into effect until *July 1st of this year*, after which date we must ask that all renewals of subscriptions be made at the new rate.

UFAW EASTER CONGRESS

This will be held at University of Liverpool Veterinary Field Station, Leahurst, Neston, Wirral, Cheshire, from April 10th to 14th. The programme will include lectures, discussions and visits on aspects of UFAW's work and of animal welfare in general. The Congress is open to students in all faculties but if bookings exceed the available accommodation preference will be given to members of UFAW.

Special reduced fee for students: £2. (*Some bursaries are also available and enquiries should be made to the Organising Secretary, UFAW*). Seniors: £3 10s. Part-time visitors will be charged pro rata Day visitors will be welcomed.

Enquiries and applications should be made to UFAW (Easter Congress), 7a Lamb's Conduit Passage, London, W.C.1. All bookings should be accompanied by a deposit of 10s. which is returnable on cancellations made before March 17th.

A NEW VETERINARY FILM

A preview was held of the new B.O.C.M. 30-minute coloured poultry film "Stoke Mandeville" on February 8th, in the Colour Film Services Theatre, London. The film outlined the growth of this research establishment from its inception as a one-hut unit in 1946. Some of the work carried out was shown, including the poultry trials for growth, egg-laying, yolk colour and genetical assessment, evaluation of feed and feed supplements, feeding methods such as cafeteria systems, blood-grouping in birds, and *post-mortem* techniques. The construction of buildings, methods of husbandry, equipment such as brooders, etc., was also illustrated. The fact that groups of 1,000 birds are used at a time indicates the thoroughness with which work is done. Dr. Blount and his fellow directors, as well as other members of the research and field staff of B.O.C.M. answered questions after the showing of the film. Among those present were members of the veterinary profession, the press, radio, television, and of the many industries and professions associated with poultry.

MR. A. B. MacINTYRE

Dr. R. F. Montgomerie writes:—

Mr. J. K. Bateman wrote a very fitting appreciation of Mr. A. B. MacIntyre who passed away so suddenly on February 5th, 1961. I was away from home when that tragic event took place but feel compelled to pay a further tribute, on my own behalf and in the name of his other colleagues on the staff of the Wellcome Research Laboratories. During a period of 28 years, Mr. MacIntyre endeared himself to every one of us as the kindliest of men, generous and loyal in the extreme. It mattered nothing if the individual was the most junior laboratory assistant or animal attendant, "Mac" was ever ready to lend a hand in overcoming day to day personal problems —and those which ran deeper. He accumulated a vast amount of knowledge, based on hard work and careful observation, which he freely placed at the disposal of his colleagues with great facility.

There must, in addition, be a very large and wide circle in the profession who deeply mourn Mr. MacIntyre's passing. The majority had their introduction in a simple contact which they quickly matured into a friendship based on their respect of the man, his ability and knowledge and on his great readiness to help.

All this was evident in the very large attendance at the funeral service on February 10th. Colleagues were joined by the many members of the profession who gathered to pay their last respects to Mr. MacIntyre and to express their deep sympathy with his widow and son.

We have been asked to add the following note:—

Mrs. Jennie Bruce MacIntyre and Ian wish to thank all those who sent such beautiful letters and flowers to Glence. They are proud that Archie Bruce MacIntyre was so loved and respected, and hope to be able to write eventually to all his friends and colleagues.

HOLIDAY EXCHANGES

Members of the profession on the Continent are making plans for the summer holidays, and the younger members of veterinary families in Britain may be interested in the following requests for exchanges.

Mlle. Brun (aged 17) would like to visit the London area for about one month, and to entertain her host in France during the following month. Mlle. Robin (aged 14) would like to arrange an exchange holiday in Cornwall, Sussex or the South of England during July or August; she comes from the Roubaix (Nord) region of France. Mlle. Guinement of Coëx (Vendee), also aged 14, is anxious to stay in England for about a fortnight and to return with her host to France for a further 2 weeks.

Mlle. Lefebvre (aged 10) and M. Millour and Mlle. Lacoudre (both aged 11) would like to write to a colleague of similar age in this country with a view to arranging exchange holidays later on when the correspondents get to know each other.

Mlle Bellec (aged 17) is anxious to stay in England on an "au pair" basis during the summer holidays. Mlle. Bru (aged 16) would like to stay "au pair" in London or one of the larger cities, preferably in a school or a small hotel, for the period August 15th to September 15th.

Members of the profession who have accommodation to offer and who would like further details are asked to contact Mrs. E. M. Stobo of 211 Yarborough Road, Lincoln.

Children are dignified by the formal title as we have no christian names from our French colleagues.

B.V.A. HANDBOOK ON SKIN DISEASES

Owing to the demand for this handbook the first printing is almost exhausted, and a second printing is under way. For this reason members may suffer a short delay in meeting their requirements, but these will be dealt with as speedily as possible.

MR. GERALD RUSHIE GREY

Mr. R. C. G. Hancock writes:—

Gerald was a coloured Jamaican. We went through the years at the Camden Town School together, and he saw practice with my father, so I probably knew him better than most of our contemporaries.

He was a quiet and self-effacing person, with a fine brain, and physically a sculptor's dream. I never saw a musculature so well defined on any other human being. I remember spending a fortnight with him at St. Margarets Bay on the downs, where we rode two hired hacks every day between Deal and Dover.

He was training as a pathologist in Sir John M'Fadyean's laboratory while he studied for his London University B.Sc., with Sheather, Sir John's right hand, and Minett, a student a year ahead of us.

He went into the R.A.V.C. at the outbreak of the 1914 war, and served in the Middle East. For some

time he was with Lawrence of Arabia, living in Arab costume like his famous commander.

After that we lost touch, but I understand he was veterinary surgeon to the Jamaica Jockey Club, and had the largest general practice on the island.

THE D. O. MORGAN MEMORIAL FUND

Readers will recall that during the early part of 1960 this Fund was established to provide an open named entrance scholarship in Natural Science for candidates who intend to read for the veterinary degree in the University of Cambridge at St. Catharine's College.

The response to the appeal has been most satisfactory and a sum in excess of £1,200 has been offered to the Governing Body of the College and has been accepted for the purpose of establishing such a scholarship. The fund is still open, but will be closed very shortly when the necessary legal formalities have been concluded. In appreciation of those who have supported the appeal the organisers wish to publish the following list of subscribers:—

J. T. Abrams; P. R. Ackroyd; Allen and Hanburys Ltd.; A. Bacon; A. Baker; Miss M. J. Barrenger; N. M. Barrie; A. O Betts; W. I. B. Beveridge; Dr. Anne Bishop; P. S. Blackburn; W. G. Blythman; Boots Pure Drug Co., Ltd.; B. Boswood; P. S. Bridge; V. A. D. Browne; J. J. C. Buckley; Dr. & Mrs. G. Campbell; H. H. Carleston; J. Carmichael; H. J. Cembrowicz; D. S. Clouston; Cooper, McDougall and Robertson Ltd.; R. S. Comline; A. Cragg; B. A. Cross; Cymdeitas y Mabinogion; L. G. Donald; G. P. Dougill; A. M. Dunn; S. D. Elliott; T. Ellis-Lewis; T. C. D. Evans; A. Foggie; E. J. H. Ford; M. H. Fussell; The Gall family; R. Moylan Gambles; E. A. Gibson; W. W. C. Gibson; R. F. W. Goodwin; H. McL. Gordon; W. Gregor; J. Russell Greig; H. E. Harbour; S. G. Harries; R. Haydon-Jones; K. W. Head; C. Horton-Smith; G. C. Hunter; A. R. Jennings; E. E. Jones; O. Pritchard Jones; Dr. Joan Keilin; R. T. Leiper; P. LeRoux; M. C. G. Littlewort; Mrs Ursula Lockhart; P. J. McCosker; H. S. McTaggart; T. T. R. Mann; H. T. Matthews; A. Maycock; R. S. Millard; J. R. Morgan (Morgan family); Mrs. Ruth E. Morgan; E. A. Molwyn-Hughes; D. W. Muncey; Miss Audrey Newnham; L. N. Owen; A. C. Palmer; L. P. Pugh; P. D. S. Pugh; E. T. Rees-Evans; M. A. E. Rex; J. N. Ritchie; Mrs. M. E. Rose; R. T. Rowland; D. W. B. Sainsbury; St. Catharine's College, Cambridge; D. E. Simpson; E. J. L. Soulsby; F. R. Spratling; D. E. Stevenson; L. F. Taffs; P. Tate; E. L. Taylor; J. A. Taylor; G. O. Thomas; C. T. Valentine; S. H. Vellacott; and A. A. Wilson.

UNIVERSITY NEWS

Bristol

The twelfth annual dinner of the Centaur Society (University of Bristol veterinary students) was held at the Berkeley Cafe on February 7th. The guest of honour, Sir Thomas Dalling, Chief Veterinary Consultant, F.A.O., was introduced by Professor A. Messervy. In proposing the health of the Society, Sir Thomas Dalling spoke of the contrast to be seen in the profession of his student days and of the present time, with particular reference to international, rather than the national aspects. Mr. H. G. Edwards, the President, replying on behalf of the Society, thanked the guest of honour for his kind comments and welcome advice, and outlined a few of the Society's activities of the past year.

The health of the guests was proposed by Mr. E. H. Shillabeer, the secretary, who welcomed the vice-Chancellor and other senior members of the University, representatives of the Liverpool, London, and International Veterinary Students' Unions, the ladies, and local veterinary surgeons, including the President of the Mid-West division of the B.V.A. Sir Philip Morris, the vice-Chancellor, replying on behalf of the guests, thanked the Society, and then spoke of Sir Thomas Dalling's close connexions with the Bristol school. He also stressed the immense importance of the profession in the world to-day, and of its inter-relationships with other sciences. Mr. M. R. Wilson proposed the toast "Absent Friends," mentioning especially Professor D. G. Lee, who has now returned to America, and Professor T. K. Ewer, who will shortly be arriving from Australia.

The dinner was followed by dancing, the whole function having been organised by Mr. C. J. Roberts.

Photograph by M. A. Coombs.

The President of the Centaur Society with some of his guests. From left to right: standing, Mr. H. G. Edwards (President of the Society), Sir Philip Morris (vice-Chancellor of the University). Seated, Professor J. M. Yoffey (Dean of the Faculty of Medicine). Sir Thomas Dalling (Chief Veterinary Consultant, F.A.O.), Professor A. Messervy (Chairman of the Board of Veterinary Studies).

THE REGISTER OF VETERINARY SURGEONS

The undermentioned gentlemen were admitted to membership of the Royal College and were registered in the Commonwealth List, on the dates indicated: Anderson, Norman, B.V.SC.(SYD.)., c/o Bank of New South Wales, Berkeley Square, London, W.1. February 13th, 1961. Chappel, Roy Alfred. B.V.SC.(SYD.)., M.B., B.S.(SYD.)., c/o Bank of New South Wales, Head Office, Sydney, N.S.W., Australia. February 10th, 1961.

The undermentioned gentlemen were admitted to membership of the Royal College on January 14th, in virtue of the registrable degree of M.V.B. of the National University of Ireland (University College, Dublin):—

Callanan, Cornelius, Bouladuff, Thurles, Co. Tipperary, Eire; Coffrey, Joseph Peter, Connogue, Shankill, Co. Dublin, Eire; Glynn, Francis Patrick, Bean Park, Bishop Street, Tuam, Co. Galway, Eire; Murphy, Ignatius, 16 Cian Park, Drumcondra, Dublin, Eire; McDermott, Bernard Augustine.

The Mall, Sligo, Eire; McEnery, Robert Joseph, 7 Ardee Road, Rathmines, Dublin, Eire; O'Gorman, Thomas Augustine, Hacketstown, Co. Carlow, Eire; Noel, Hugh Vincent, Castlebar Street, Westport, Co. Mayo, Eire; Waldron, John Francis, 1 Rosmeen Gardens, Dun Laoghaire, Co. Dublin, Eire; Walsh, John Gabriel, Main Street, Granard, Co. Longford, Eire; and Weavers, Edwin Dermond, 43 Duke Street, Athy, Co. Kildare, Eire.

R.C.V.S OBITUARY

Supplementary Veterinary Register

We record with regret the death of the following member:—

THAXTER, Leonard Samuel Sproule, 31 Salisbury Road, Norwich.

PERSONAL

Births

HARRISON.—On February 10th, 1961, to Josa, wife of Keith Harrison, M.R.C.V.S., Sheepcote, Denston, Nr. Newmarket, a son, brother for Simon.

STARTUP.—On February 4th, 1961, to Christine and Geoffrey Startup, Grove Lodge, Broadwater, Worthing, twins, Jeremy and Julia.

COMING EVENTS

February

22nd (Wed.). SUSSEX VETERINARY SOCIETY. Joint Meeting with the local Division of the B.M.A. preceded by dinner at 7 p.m.

EASTERN COUNTIES VETERINARY SOCIETY. Winter Meeting at the Bell Hotel, Norwich, 11.15 a.m.

CAMBRIDGE UNIVERSITY VETERINARY SOCIETY. 2nd Keith Entwistle Memorial Lecture in the Lecture Rooms, Mill Lane, Cambridge, 8.15 p.m. Speaker: Mr. T. Holmes Sellors, D.M., M.CH., F.R.C.S.

SCOTTISH BRANCH. Meeting at Glasgow University Veterinary Hospital, Bearsden, Glasgow, 2.30 p.m.

SUSSEX VETERINARY SOCIETY. Annual Joint Meeting with the Brighton and Mid-Sussex Division of the B.M.A. at the Dudley Hotel, Hove, 8.30 p.m.

SOCIETY OF PRACTISING VETERINARY SURGEONS. Joint Meeting with the Southern Counties Veterinary Society at the Red Lion Hotel, Milford Street, Salisbury, Wilts., 7.30 p.m.

23rd (Thurs.). MIDLAND COUNTIES VETERINARY ASSOCIATION. Meeting at the Feathers Hotel, Bull Ring, Ludlow, Salop, 2.30 p.m.

24th (Fri.). LIVERPOOL UNIVERSITY VETERINARY SOCIETY. Annual Ball in the Students' Union, Bedford Street, Liverpool, 8 p.m.

ASSOCIATION OF VETERINARY TEACHERS AND RESEARCH WORKERS (SOUTHERN REGION). 12th Annual General Meeting at the Royal Veterinary College, Royal College Street, Camden Town, London, N.W.1, 2.15 p.m.

27th (Mon.). EAST YORKSHIRE CLINICAL CLUB. Meeting at the Talbot Hotel, Malton, 8 p.m.

March

1st (Wed.). LANCASHIRE VETERINARY ASSOCIATION. Annual General Meeting at the Department of Veterinary Pathology, University of Liverpool, 2.30 p.m.

B.V.A. TECHNICAL DEVELOPMENT COMMITTEE. Meeting at 7 Mansfield Street, London, W.1, 10.30 a.m.

WEST WALES VETERINARY CLUB. Annual Dinner at the River Room, Ivy Bush Hotel, Carmarthen, 7.30 p.m.

CORNWALL VETERINARY CLINICAL CLUB. Meeting at the Royal Hotel, Bodmin, 7.30 p.m.

2nd (Thurs.). CENTRAL VETERINARY SOCIETY. General Meeting at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

8th (Wed.). ASSOCIATION OF VETERINARY TEACHERS AND RESEARCH WORKERS, NORTHERN REGION. Annual General Meeting at the Department of Veterinary Pathology, University of Liverpool, 2 p.m.

9th (Thurs.). V.V.B.F. NORTH OF SCOTLAND DIVISION. Annual Dinner and Dance in the Northern Hotel, Aberdeen, 7.30 p.m.

10th (Fri.). GLASGOW UNIVERSITY VETERINARY MEDICAL ASSOCIATION. Annual Ball in the St. Enochs Hotel, 8 p.m.

15th (Wed.). R.A.V.C. DIVISION. Meeting at the R.A.V.C. School and Stores, Thornhill, Aldershot, 11 a.m.

18th (Sat.). B.S.A.V.A. NORTH WESTERN REGION. Meeting at the Exchange Hotel, Liverpool, 7.30 p.m.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Glam. Gadairwen House, Groesfaen, Pontyclun (Feb. 7).
Oxon. Bruern Grange Farm, Bruern, Churchill (Feb. 7).
Renfrew. Sandholes Farm, Johnstone (Feb. 9).
Ross. Shoretown, Culbokie, Canon Bridge, (Feb. 8).
Yorks. Manor Farm, Harswell (Feb. 9).

Foot-and-Mouth Disease

Middlesex. The Bell, 85 Charlton Road, Shepperton (Feb. 12).

Fowl Pest

Berks. 48 Main Road, East Hogbourne, Didcot (Feb. 11).
Bucks. 21 The Marroway, Stoke Mandeville, Aylesbury (Feb. 7).
Essex. Highwood Farm, Halstead (Feb. 7); Great Bardfield Hall, Great Bardfield, Braintree (Feb. 9); Rye Hill, Epping (Feb. 12).
Hants. Gommers Hall, Lower Quadrant, Ash Vale, Aldershot (Feb. 7); Rose Cottages, Curdridge, Southampton (Feb. 9); The White Swan Hotel, Ash Vale, Aldershot (Feb. 11).
Hereford. Little London, Staunton-on-Wye (Feb. 7).
Lancs. Cunliffe Fold Farm, Salwick, Preston (Feb. 7); Moss Farm, Moss Lane, Catforth, Preston (Feb. 8).
Norfolk. Brackenwood, Horsford, Norwich (Feb. 7); West End Farm, Old Costessy, Norwich (Feb. 8); Fir Covert Road, Felthorpe, Norwich; Sunray, Lamas, Norwich;

Sutton Turkey Farm, Sutton, Norwich; The Cottage, Trunch, North Walsham (Feb. 9); 17 School Road, Buckenham, Norwich; Pound Farm, Hevingham, Norwich (Feb. 10); Grange Farm, Hevingham, Norwich; Bridge Farm, Waxham, Great Yarmouth (Feb. 11).

Northants. Grafton Fields, Grafton Regis, Towcester (Feb. 11).

Salop. Abbey Farm, Lilleshall, Newport (Feb. 9).

Somerset. Horton Hall, Chipping Sodbury, Bristol (Feb. 7).

Suffolk. Shelley, Stanstead, Sudbury, (Feb. 9); Mill House, Stutton, Ipswich (Feb. 10).

Sussex. Cambridge House, Bell Lane, Birdham, Chichester (Feb. 10).

Yorks. The Croft, Laneside, Queensbury, Bradford (Feb. 8).

Swine Fever

Dorset. Millock Farm, Waterloo Road, Corfe Mullen, Wimborne (Feb. 8); Wine Green, Wheelers Lane, Canford, Magna; Cottage Farm, Merley Park Road, Ashington, Poole (Feb. 9).

Flints. Pant Farm, Carmel, Holywell (Feb. 8).

Glam. Greenlands Bungalow, Station Road, Grovesend, Swansea (Feb. 8); Talycoppa Goch, Llansamlet, Swansea (Feb. 10).

Glos. Woodside New Road, Blakeney (Feb. 10).

Hants. Danestream, Sway Road, New Milton; Clobb Farm, Beaulieu, Brockenhurst (Feb. 8); Southwood Farm, Cove, Farnborough (Feb. 10).

Lancs. 189 Liverpool Road, Lydiate, Liverpool (Feb. 8).

Norfolk. The Piggeries, The Heath, Filby, Great Yarmouth (Feb. 7).

Staffs. Grace Dieu, Coal Pit Lane, Coton-in-the-Elms, Burton-on-Trent; Swan Farm, Mill Lane, Stonnall, Walsall Wood, Walsall (Feb. 7); Chase Cottage, Church Lane, Etchin Hill, Rugeley (Feb. 10).

Warwicks. 528 Redditch Road, Kings Norton, Birmingham, 30 (Feb. 9).

Yorks. Bushy Hill Farm, Newblad (Feb. 7); Aysgarth, Scotton, Knaresborough; Constitution Hill Farm, Molescroft, Beverley (Feb. 10).

THE ECONOMICS OF VETERINARY PRACTICE

In drawing the attention of readers to the book on this subject recently published by the Society of Practising Veterinary Surgeons we much regret that, owing to a misunderstanding, a wrong impression was given as to its price to new members of the S.P.V.S. May we make it clear that new members of that Association may receive the book for the sum of £1 *in addition to the first annual subscription* which is also £1. It will be appreciated that new members still receive a substantial concession in that they have all the advantages of the first year's membership of the S.P.V.S. in addition to the book itself for less than the book's price to non-members, which is 50s.

CLASSIFIED ADVERTISEMENT RATES

At its January meeting, Council approved a recommendation from the Editorial Committee that rates for classified advertisements in THE VETERINARY RECORD should be increased moderately. The clerical work involved in these advertisements is quite out of proportion to the income, and even the new rates will be considerably lower for our members than those in comparable journals. The new rates will operate *as from our issue of March 4th.* They are shown on advertisement page XXIX.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Disease of Turkey Poults

Sir,—We feel that readers of Dr. Sinkovic's most interesting account of turkey losses in New South Wales may infer that the cause of the heavy losses seen last year in British turkeys is still obscure.

May we perhaps anticipate any misunderstanding on this point by saying that it appears to be generally agreed that the British "turkey disease" losses were due to the use of Brazilian ground nut (B.G.N.) and that our experience at Norwich clearly supports this suggestion. Thus, apart from much circumstantial evidence indicating the losses to be of dietary origin, we found that in only one of the 88 outbreaks we diagnosed was there no history of the use of B.G.N. Of the other 87 outbreaks, 86 occurred on 9 brands of food, all of which were known to contain B.G.N., whereas other brands, which did not contain this ingredient, remained noteworthily free of trouble. The remaining outbreak commenced within 4 days of the addition of B.G.N. to a home-mixed ration.

As far as we are aware no one has yet identified the toxic factor or factors evidently present in some batches of B.G.N. Nevertheless, we feel that it would be unfortunate if the impression were created that the cause of these losses is still completely obscure.

Yours faithfully,
E. A. GIBSON,
A. H. HARRIS.

Veterinary Investigation Centre,
Mile Cross Lane,
Norwich,
Norfolk.
January 30th, 1961.

Reference

SINKOVIC, B. (1961). *Vet. Rec.* **73**: 86.

Turkey "X" Disease and the Labelling of Poultry Foods

Sir,—Like Mr. T. Barton Mann I was greatly impressed by the excellent paper read by Dr. Blount at the recent Conference of the British Turkey Federation on his diligent enquiry into the cause of so-called Turkey "X" Disease.

I feel little doubt that there is much evidence to indicate that there was an association

between the feeding of Brazilian groundnut meal and the occurrence of this disease. However, I would like to draw your readers' attention to the fact that there may have been certain exceptions to Dr. Blount's conclusions. These are acknowledged by him and then apparently dismissed. I have personal knowledge of at least 2 confirmed outbreaks of Turkey "X" Disease where, to my knowledge, no Brazilian groundnut meal and, in fact, no groundnut meal of any origin was included in the ration fed to the poults. A similar condition was reported by Sinkovic (*Vet. Rec.* **73.** 86) in which the feeding of certain types of wheat was incriminated. Then again, why have there been reports of at least 1 case which responded to antibiotic treatment? Perhaps further light will be shed on this fascinating subject during this coming season when it is very unlikely that Brazilian groundnut meal will be fed to turkeys.

It is interesting to recall a letter from Mr. Barton Mann (*Vet. Rec.* **72.** 715) in which he hazards a guess that some types of milo were likely to cause Turkey "X" Disease. He also suggested that milo should never be included in turkey foods and it would now seem that he is decrying all forms of groundnut as ingredients in these foods. Your readers may be interested in this and other points raised by Mr. Barton Mann (*Vet. Rec.* **73.** 132) regarding the labelling of animal foods.

It is suggested that if the bag containing a food were labelled to show the ingredients then the veterinarian and the farmer would be more fully informed. While this is true to some extent I would suggest that there are few veterinarians and fewer farmers who would be able to decide as to the suitability of a ration simply by looking at a lengthy list of ingredients.

While we might all agree in general with Mr. Barton Mann's criteria for turkey starter rations it must be realised that he is expressing a personal opinion that these foods should not contain groundnut meal. Without analysing a complete formula it is impossible to decide whether his standards for lysine are being satisfied. Surely the inclusion of only 2 per cent. groundnut cannot materially affect the suitability of a ration and, while I too would have doubts as to the merit of raising this inclusion to 18 per cent. these doubts could easily be misplaced if synthetic methionine and lysine had been included.

Further, how can Mr. Barton Mann state that the inclusion of groundnut meal will unbalance a ration with respect to oil, albs, fibre or protein: productive energy ratio without knowing the full formula? I notice also that turkey starter food should not contain more than 3 per cent. of oil otherwise there will be destruction of vitamins A and E. Surely, if one of the modern gelatine or wax-protected forms of these vitamins which are now freely available are used, any destruction which takes place due to the condition of the oil content of the food will be extremely small. In any case, I am sure that manufacturers of repute would include a reasonable safety margin.

I am also sure that if a veterinarian feels that a disease which he is investigating may be related to the food given to the animals, then these same reputable feeding-stuff manufacturers will be only too pleased to co-operate with him in his investigations.

Yours faithfully,
W. W. C. GIBSON.

R. & W. Paul Limited,
Key Street,
Ipswich.
February 13th, 1961.

Uterus Unicornis in a Kitten

Sir,—Recently I conducted a *post-mortem* examination, the results of which I feel should be published in view of the rarity of the condition. The subject was a 6-month-old female kitten.

On opening the abdomen and displacing the alimentary tract the following points were noted.

The right uterine horn, right ovary and the body of the uterus were of normal size.

The left uterine horn was represented by a thin fibrous band approximately 1 mm. wide.

The left ovary was, apparently, normal.

The left kidney and left ureter were both absent.

The incidence of uterus unicornis in the feline animal is, according to Roberts, about one in a thousand. I can find no record of an allied absence of kidney tissue.

As the reproductive duct system develops in close connexion with the embryonic urinary system (the Müllerian ducts furnishing the oviducts, uterus and vagina) and the gonads are developed from a specialised genital ridge, this case could be explained on a single embryological basis. I would be very interested to hear if such a complex has been observed before in the feline animal.

Yours faithfully,
G. A. SMITH.
(Final year).

Glasgow Veterinary Hospital,
Bearsden Road,
Bearsden,
Glasgow.
February 6th, 1961.

Enteric Diseases of Calves

Sir,—May I beg space to reply to Mr. Clement's observations of February 1st (*Vet. Rec.* **73.** 132) on the metabolism of vitamin A in the young. This aspect of disease/nutrition is so important with regard to broiler veal production that the paucity of information needs to be rectified as soon as possible.

It was in an attempt to throw some light on the matter that I turned from the examination of vitamin A metabolism in chicks to the metabolism of calves and I carried out many examinations of colostrum. The results were so greatly divergent, 20 to 400 I.U. A per gm. fat, with no apparent differences under natural rearing, that the work was abandoned.

However, Mr. Clement seems to propose that disease is the precursor of upset to vitamin A metabolism, whereas my contention tends to be that an upset to vitamin A metabolism precipitates disease. As far as enteric diseases of the young are concerned

I can say that practical field trials with many thousands of chicks and poults substantiates my contention. Not that vitamin A is the whole story, but rather, I have found that if vitamin A metabolism is satisfied then other things fit into place and enteric diseases disappear.

As Mr. Clement knows of no experimental evidence that the young animal utilises vitamin A-esters inefficiently, I would mention that in 1946 I studied the utilisation of vitamin A ester by chicks, using cod liver oil as the ester source (87 per cent. of the vitamin in cod liver oil is esterified). The following are the findings on chicks which had been fed a non-depressant diet (*vide* Black *et al.*, 1954) to complete depletion of vitamin A by 31 days and then given cod liver oil as an ester source of the vitamin.

Age of chick in days	*No. of carcases analysed*	*Vitamin A I.U.*
8	6 killed	114
15	6 killed	41
21	6 killed	62
24	3 killed	trace
28	3 killed	trace
from 31st day cod liver oil as ester source added to ration.		
35	3 killed	nil
(33	1 dead chick, liver only analysed	nil)
36	3 dead chicks, livers only analysed	nil
40	3 dead chicks, livers only analysed	nil
42	6 killed, livers only analysed	41

This whole study established the fact that for the chick there is little utilisation of vitamin A supplied in the diet in any form, alcohol, ester or as the precursor carotene before the 19th day. It is reported by Cruickshank (1935) and Sherwood and Fraps (1936) that if feed is very low in vitamin A, the mortality of chicks hatched from such a diet will be high during the first 2 weeks of life regardless of the amount of vitamin A in the chick diet. If the mother hen was fed an adequate amount of vitamin A, but the chicks are fed an inadequate amount of this vitamin, the survival period of the chicks will extend from 4 to 7 weeks.

Is there any reason to believe that man-made diets for broiler calves will behave differently from man-made diets for chicks?

Yours faithfully,
T. BARTON MANN.

Braust,
Weyhill,
nr. Andover,
Hants.
February 11th, 1961.

References

BLACK, D. J. G., JENNINGS, R. C., MORRIS, T. R., & PALGRAVE, J. A. (1954). 10th World's Poult. Cong.
CRUICKSHANK, E. M. (1935). *Nutr. Abst. and Rev.* **5**. 1.
SHERWOOD, R. M., & FRAPS, G. S. (1936). *Tex. Agr. Exper. Sta. Bull.* 528.
BARTON MANN, T. (1946). *J. Agric. Sci.* **36**. Part 4. 289.

Shared Services of a Locum Tenens

Sir,—Members of the profession may recall that a year ago Mr. Holmes of Totteridge, London, and I pioneered a scheme to engage the services of a veterinary surgeon throughout the whole year to act as locum within a group of 6 practices.

This new venture worked well and members who previously found difficulty have managed to take a month or so holiday leaving their affairs in known and well-trusted hands.

It is better to engage a single man in view of the moving, and where possible to let him stay in one place for a month at a time. The scheme is best suited to 2- and 3-man practices, the members taking consecutive holidays. The year is divided into winter and summer, members taking equal time in each half. Full board and accommodation are provided, and local time off and use of car is arranged with each principal. Simple agreements as to working conditions, to safeguard all parties, are drawn up. Administration is done by one member who volunteers, the other members paying dues to him.

Choice of dates is by rota with tolerance towards individuals' problems. The locum is given a month's holiday with pay, and remuneration and hospitality must be of a high order.

The locum gained confidence and experience in one year which would normally require several years in ordinary practice. The opportunity to work with a dozen members and to study the business methods of 6 successful practices in one year is unique. Our present incumbent commends it to colleagues wishing to gain wide experience quickly.

We found the scheme definitely workable and fair to all concerned, and if we can find another veterinary surgeon to fill the post this spring we intend to carry it on.

We shall be happy to advise members who are thinking of starting similar groups.

Yours faithfully,
O. L. TWEEDALE.

20 High Street,
Minster,
Ramsgate.
February 10th, 1961.

A Practical Memorial to Mr. A. B. MacIntyre

Sir,—The sad news of the sudden death of Mr. A. B. MacIntyre last Sunday will be a great shock to members of the profession. Hundreds of us all over the country have phoned him at all hours to seek his advice on some difficult problem and have always received a helpful and courteous reply, to say nothing of the *post-mortem* and laboratory examinations he has carried out for us. As you well know all these services and advice were gratis, and we feel a number of us would like to show our appreciation of his help over the years. What better can we do than send a donation, to the Victoria Veterinary Benevolent Fund in his memory?

Recently, in your columns, attention has been drawn to the inability of members of the profession to write a letter, so we appeal to them all to put their hands in their pockets, pull out a note, think of all the help they received from Archie MacIntyre over the past years, put it in again and draw out some more. Slip this into an envelope and address it to

Mr. Francis, Archie MacIntyre Memorial Fund, Victoria Veterinary Benevolent Fund, College House, Wright's Lane, Kensington, London, W.8. There is no need for busy people to write a note, but please put a stamp on the envelope. If you have the time, a cheque will be equally acceptable but due to the poor response to the Christmas appeal we have lost confidence in our colleagues to take this trouble; so perhaps an unorthodox appeal may have better results.

Let us show Mrs. MacIntyre and her family that we have really appreciated all her husband did for us in the past, and make this a record appeal.

Yours faithfully,
HARRY S. GATES,
GEOFFREY W. SERTH.

102 Brighton Road,
Purley, Surrey.
February 7th, 1961.

Results of Vaccination with Lungworm (Oral) Vaccine in the Field in 1960

Sir,—In May, 1960, you published a letter from 2 of us (B.V.J. and A.M.R.N.) regarding the results achieved with lungworm (oral) vaccine* in its first year of commercial production (*Vet. Rec.* **72.** 395). Some veterinary surgeons have commented to us that as 1959 was not a serious year for husk in some parts of the country, the results obtained were not a true indication of the efficacy of the vaccine.

In our experience 1960 proved to be a bad "husk year" in practically all parts of the United Kingdom, and many practices have reported to us that parasitic bronchitis has been as serious a problem last season as in 1958, and in some cases the worst year in their experience. We have been impressed by the low incidence of the disease on farms where the vaccine has been employed during the year and many veterinary surgeons have informed us that farms where husk was an annual occurrence have been free from the disease following the use of the vaccine. These reports, in conjunction with the conclusions reached in the investigations reported below, lead us to believe that the vaccine has proved itself to be of great value in controlling a disease whose impact is of maior importance to the economics of the livestock industry.

It has been estimated that the vaccine was used on approximately 8,000 farms in 1960, and on only 28 (0.35 per cent.) of these was any evidence of parasitic bronchitis observed in vaccinated calves. Seven of the 28 farms had husk in only one animal, 3 were complicated by the presence of cuffing pneumonia, and 3 more by cuffing pneumonia and clinical symptoms of gastro-intestinal parasites, confirmed on examination of faeces.

On the remaining 15 farms more than one animal was involved, but on only 11 of these, all with a history of serious parasitic bronchitis, were marked clinical symptoms observed. On some farms vaccinated and susceptible animals were admitted to the same pasture, thus introducing a risk of heavy pasture contamination, since susceptible animals may build up a massive larval population very quickly if climatic conditions are right. If vaccinated calves are exposed to such a massive challenge, their immunity may be overcome. Where pasture contamination is not excessive, however, results from grazing vaccinated and susceptible stock together are most satisfactory. If all calves are vaccinated, then there is little risk of a build-up of larval contamination of the pasture.

Reports of coughing or loss of condition were received from 68 (0.85 per cent.) farms in which no evidence of parasitic bronchitis was found on repeated faeces examination. On 45 of these farms where coughing occurred, clinical history in conjunction with auscultation of the chest and subsequent progress, led us to the opinion that cuffing pneumonia was responsible for the symptoms. Where *post-mortem* examination was possible, this diagnosis was confirmed. On 13 farms a similar clinical history was seen, but complicated by parasitic gastro-enteritis. Four farms showed only transient coughing, 3 a bacterial pneumonia, and on 3 farms loss of condition was caused solely by parasitic gastro-enteritis.

Parasitic gastro-enteritis is reported to have been a serious problem in 1960. This has been reflected in the significant egg counts, in the absence of clinical symptoms, encountered in examination of faeces samples taken during the course of many of our investigations. The presence of these parasites may play a significant part in the reduction of resistance of the vaccinated animal when its immunity is exposed to a heavy challenge.

A total of 13 farms showed pneumonic symptoms some time after administration of Dictol. in some cases as early as 12 hours after dosing. None of these farms used the same batches of vaccine and no symptoms were noticed in the safety test calves, kept as controls in isolation on our premises.

The results obtained are possibly incomplete, as it is known that some veterinary surgeons have themselves dealt with minor problems. Any symptoms giving cause for concern have, however, generally been reported. In view of this, and taking into account the severity of parasitic bronchitis infections this year, we believe that the extremely low incidence of reported cases of husk among vaccinated animals amply demonstrate the efficacy of the vaccine.

Yours faithfully,
A. M. R. NELSON,
BRUCE V. JONES,
R. PEACOCK.

Veterinary Division,
Allen & Hanburys Ltd.,
Bethnal Green, E.2.

Veterinary Research Department,
Allen & Hanburys Ltd.,
Ware Herts.
February 3rd, 1961.

Serum Transaminases and Liver Cell Damage

Sir,—It would seem that transaminase estimations will provide an effective method for the diagnosis of active liver cell damage in dogs. These tests are now in routine use in many hospital laboratories for the diagnosis of infective hepatitis in man (Serum Glutamic Pyruvic Transaminase; SGPT), and myocardial infarction (Serum Glutamic Oxaloacetic Transaminase; SGOT).

* "Dictol": Allen & Hanburys Ltd.

Estimations have been made on some 70 samples of canine sera; normal values have been calculated from 11 young healthy dogs and these are in fairly close agreement with those given by Cornelius, Bishop, Switzer and Rhode (1959), and by Malherbe (1960), the normal SGPT being 18.0 ± 2.3 units, and the normal SGOT 27.0 ± 1.1 units.

During this investigation sera from 4 puppies that had been injected with the virus of hepatitis contagiosa canis were received for examination. Within 5 days of this injection the SGPT values had increased to 117, 119, 453, and 2,650 units, and the SGOT to 20, 35, 46, and 9,725 units. No abnormality was shown by serum alkaline phosphatase, electrophoresis, the empirical turbidity tests or the cholesterol ester ratio.

Cases of jaundice of different aetiology gave SGPT values ranging from 80 to 1,040 units, and SGOT from 80 to 420 units. Two cases of suspected liver neoplasia gave values of 100 and 140 units.

In dogs it appears that SGPT is a better index of liver cell damage than SGOT; both enzymes are raised in cases of nephritis (SGPT, 32 to 89, SGOT 33 to 179 units) but in this condition SGOT shows a more marked increase.

A full account of these experiments will be published in due course.

Yours faithfully,
CELIA M. HOE.

Department of Pathology,
Royal Veterinary College,
London, N.W.1.
February 10th, 1961.

References

CORNELIUS, C. E., BISHOP, J., SWITZER, J., RHODE, E. A. (1959). *Cornell. Vet.* **49**. 116.
MALHERBE, W. D. (1960). *J. S.Afr. vet. med Ass.* **31**. 1. 159.

A Hazard Encountered in the Use of Rubber Ring Castration of Lambs

Sir,—Recently 2 large 2-day-old Dorset Horn × Half Bred male lambs were presented for examination, one dying and one already dead.

The comatose lamb revealed a full distended abdomen which on palpation was found to contain a grossly enlarged bladder. No urine could be expressed from the urethra, obstruction of which seemed due to the rubber castration ring. Euthanasia was advised.

Post-mortem examination of the dead lamb showed swelling of tissues above the rubber ring with much oedema apparently causing complete occlusion of the urethra; the bladder was very full and the renal pelvises were grossly distended with urine.

These lambs had been castrated within the first 6 hours after birth. Perhaps the testicles are not sufficiently descended in the scrotum at this early age and thus this technique results in the ring being applied too close to the urethra.

No similar trouble has been encountered on this particular farm in lambs castrated by this method when more than 1 day old.

Yours faithfully,
E. P. NELSON.

81a, Wantage Road,
Wallingford,
Berks.
February 7th, 1961.

Control of Swine Fever

Sir,—The recent announcement by the Minister of Agriculture that there is to be some scheme for the control of swine fever might have been welcomed by our profession and the farming community had there been some indication as to the form this will take.

As it is, it has "gummed up" the workings of several bodies who have been trying to reach agreement towards the extension of vaccination schemes such as that run in Cheshire.

In areas where swine fever is not common it is difficult to persuade the pig-keeper to carry out vaccination, and the rather airy-fairy promises of compensation made recently has made this even more difficult.

Extension of the various vaccination schemes would appear to hold out the best hope of complete eradication, and it is hoped that the Minister will make public without delay the plans he has in mind. Let us hope that they will go hand in hand with the efforts the profession is already making to cope with this disease—perhaps with some financial assistance towards making crystal violet vaccine cheaper and thus permitting us to keep the cost of vaccination to a figure nationally acceptable to the pig industry.

Yours faithfully,
PETER J. DALTON.

Old Sarum House,
Stratford Road,
Salisbury.
February 10th, 1961.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 31st January 1961		16	—	3	121	—	57
Corresponding period in	1960	5	—	1	214	—	26
	1959	4	—	—	47	—	29
	1958	8	—	28	45	—	58
1st January to 31st January 1961		27	—	14	266	—	95
Corresponding period in	1960	22	—	5	449	—	94
	1959	12	—	—	80	—	84
	1958	15	—	43	120	—	106